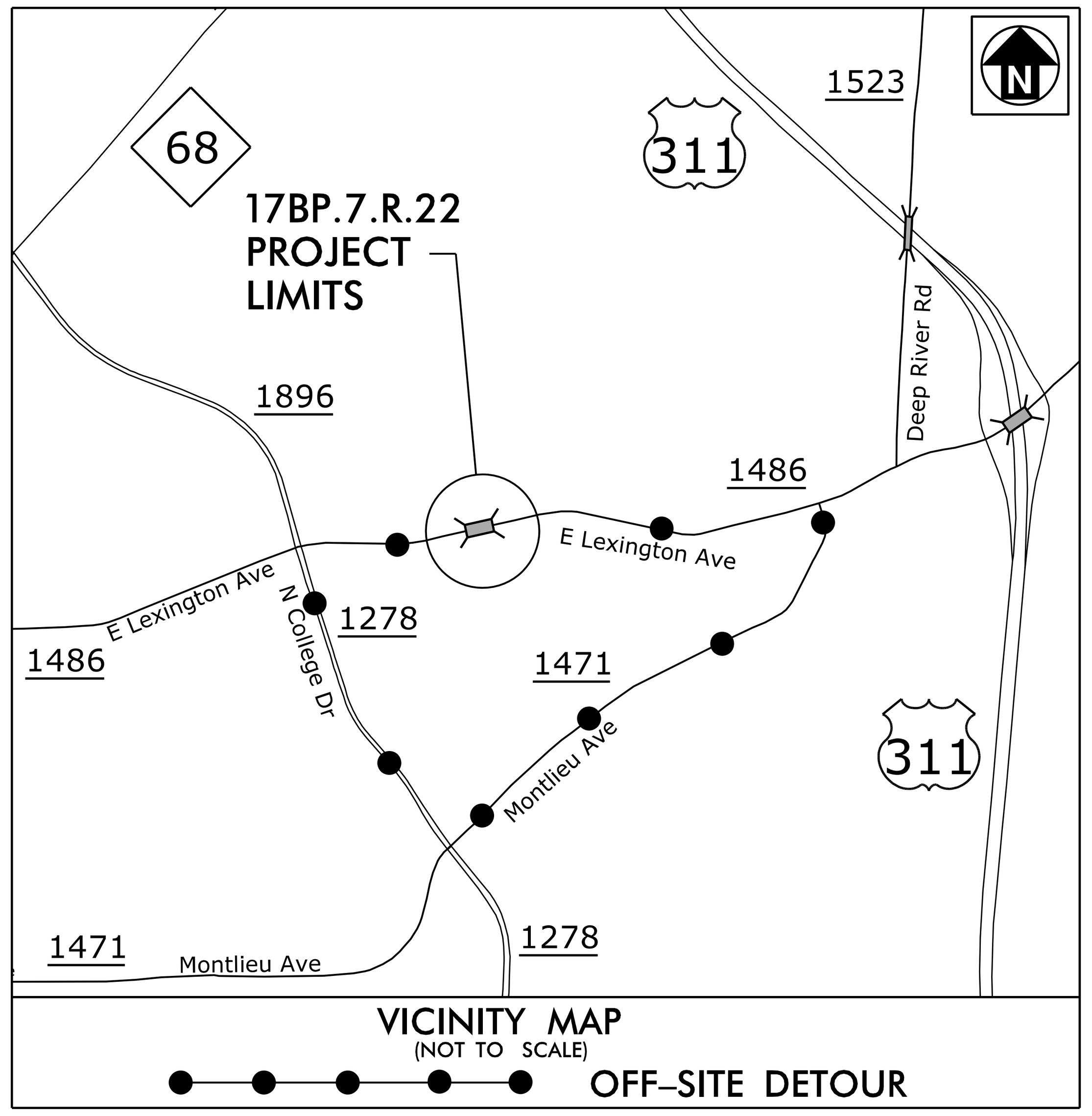
TIP PROJECT: 17BP.7.R.22

CONTRACT:

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.7.R.22	1	

STATE PROJECT NO.	F.A. PROJ. NO.	DESCRIPTION

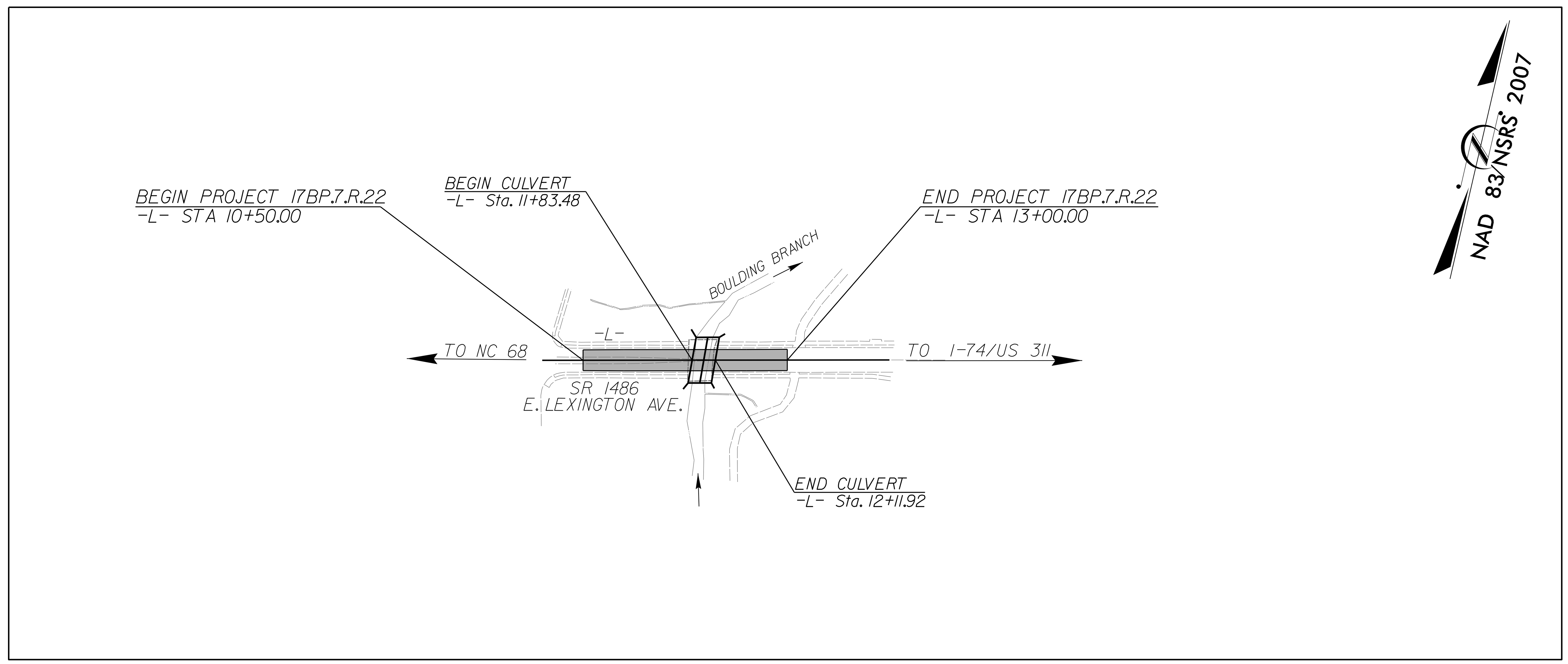


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY

LOCATION: BRIDGE NO.895 OVER BOULDING BRANCH ON SR 1486 (LEXINGTON AVENUE)

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE



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DESIGN DATA

ADT 2007 = 9200

V = 35 MPH

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT	=	0.042 MILES
LENGTH STRUCTURE TIP PROJECT	=	0.005 MILES
TOTAL LENGTH TIP PROJECT	=	0.047 MILES

Prepared In the Office of Hatch Mott MacDonald for

DIVISION 7

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

LETTING DATE:

TIM JORDAN, PE
PROJECT ENGINEER

DAVID FUH, PE
HYDRAULICS ENGINEER

NCDOT CONTACT:

TIM POWERS, PE
DIVISION BRIDGE PROGRAM MANAGER

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 21102 JAMES TIMOTHY JORDAN

DocuSigned by: James Timothy Jordan
11/30/2015
P.E.
SIGNATURE:

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19732 SHIHCHEN FUH

DocuSigned by: Shihchen Fuh
11/30/2015
P.E.
SIGNATURE:

PLANS PREPARED BY:

Hatch Mott MacDonald
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
(919) 552-2254 (Fax)
www.hatchmott.com
LICENSE NO. F-0669

ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258

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PROJECT REFERENCE	SHEET NO.
17BP.7.R.22 – GUILFORD #895	1-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN

DocuSigned by: James Timothy Jordan 0BE86A5414784C1...

11/30/2015

HATCH MOTT MACDONALD I & E, LLC
LICENSE NO. F-0669

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Prepared in the Office of: Hatch Mott MacDonald PO Box 700 Fuquay-Varina, NC 27526 www.hatchmott.com

GENERAL NOTES:

2012 SPECIFICATIONS
EFFECTIVE: 01-17-12
REVISED: 07-30-2012

GRADE LINE:
GRADING AND SURFACING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE CITY OF HIGH POINT, TIME WARNER CABLE, INC., PIEDMONT NATURAL GAS, INC., AND NORTHSTATE COMMUNICATIONS.

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS.

INDEX OF SHEETS

2012 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
840.00	Concrete Base Pad for Drainage Structures
840.01	Brick Catch Basin - 12" thru 54" Pipe
840.02	Concrete Catch Basin - 12" thru 54" Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
840.45	Precast Drainage Structure
840.66	Drainage Structure Steps
840.71	Concrete and Brick Pipe Plug
846.01	Concrete Curb, Gutter and Curb & Gutter
848.01	Concrete Sidewalk
862.01	Guardrail Placement
862.02	Guardrail Installation
876.01	Rip Rap in Channels

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PROJECT REFERENCE	SHEET NO.
17BP.7.R.22 – GUILFORD #895	1–B

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H–Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth — T
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

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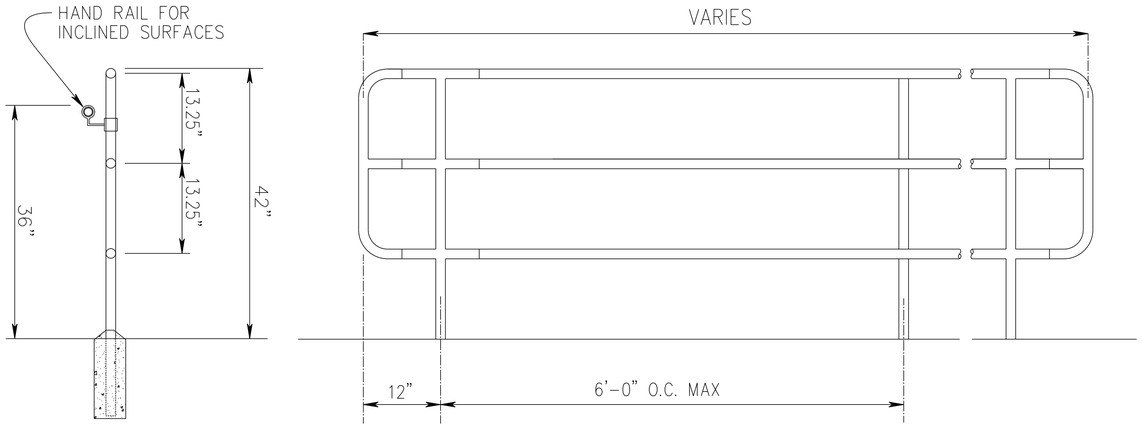
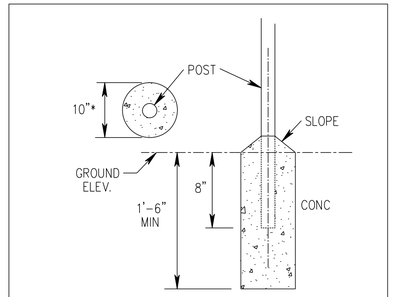
PROJECT REFERENCE	SHEET NO.
17BP.7.R.22 – GUILFORD #895	2–A

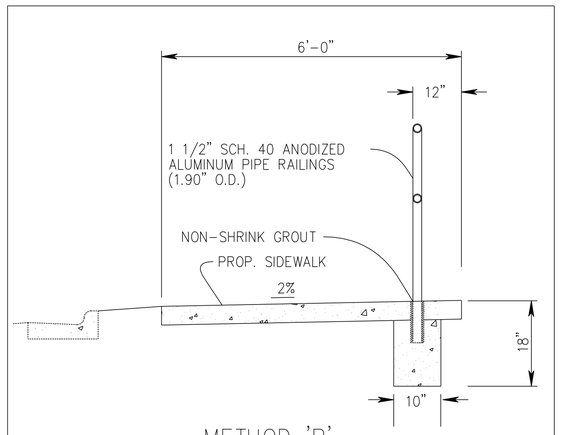


SAFETY RAIL DETAIL



METHOD 'A'

SAFETY RAIL INSTALLATION DETAIL
CONC. FOOTING TO BE USED ON ALL POSTS



METHOD 'B'

HANDRAIL INSTALLATION DETAIL
BACK OF WALK MOUNTED

SAFETY RAIL IS REQUIRED IF:

- THERE IS A VERTICAL DROP OF 30" OR MORE WITHIN 4 FT OF THE WALK
- THERE IS A SLOPE OF 2:1 OR STEEPER WITHIN 4 FT OF THE BACK OF THE WALK
- THERE IS A SLOPE OF 3:1 OR STEEPER WITHIN 4 FT OF THE BACK OF WALK WITH A TOTAL ELEVATION CHANGE OF 6 FT OR GREATER.

SAFETY RAIL NOTES:

1. ALL RAILING IS TO BE 1 1/2" SCHEDULE 40 CLEAR ANODIZED ALUMINUM TUBING.
2. SECTIONS TO BE JOINED, WHERE NECESSARY, WITH FRICTION–TYPE INTERNAL SPLICES SECURED WITH EPOXY. NO FIELD WELDING OR MECHANICAL FASTNERS WILL BE ALLOWED.
3. RAILS ARE TO BE SHOP ROLLED TO MATCH REQUIRED CURVATURE AS NECESSARY. FIELD BENDING IS NOT ALLOWED.
4. BOTTOM OF POSTS TO BE EMBEDDED IN CONCRETE SHOULD FIRST BE PROTECTED WITH TWO–PART EPOXY DIPPING OR ZINC CHROMATE COATING TO PREVENT CORROSION.
5. ONLY NON–METALLIC, NON–SHRINK GROUT IS TO BE USED FOR SECURING POSTS IN CONCRETE.
6. ALL EXPOSED BUTT JOINTS TO BE TIGHT AND FLUSH.
7. USE METHOD 'B' WHEN THE CENTER OF THE RAIL IS 6" OR LESS FROM THE BACK OF WALK.
8. THE HANDRAIL FOR INCLINED SURFACES IS REQUIRED WHEN THE RUNNING SLOPE IS 5% OR GRETER AND SHALL MEET ALL THE APPLICABLE REQUIREMENTS AND PROVISIONS OF SECTION R408 OF THE ADA ACCESSIBILITY GUIDELINES FOR PUBLIC RIGHTS–OF–WAY

CITY OF GREENSBORO	
STANDARD SAFETY RAIL DETAILS AND INSTALLATION	STD. NO. 446

PROJECT REFERENCE	SHEET NO.
17BP.7.R.22 – GUILFORD #895	2

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 21102 JAMES TIMOTHY JORDAN

11/30/2015

HATCH MOTT MACDONALD I & E, LLC LICENSE NO. F-0669

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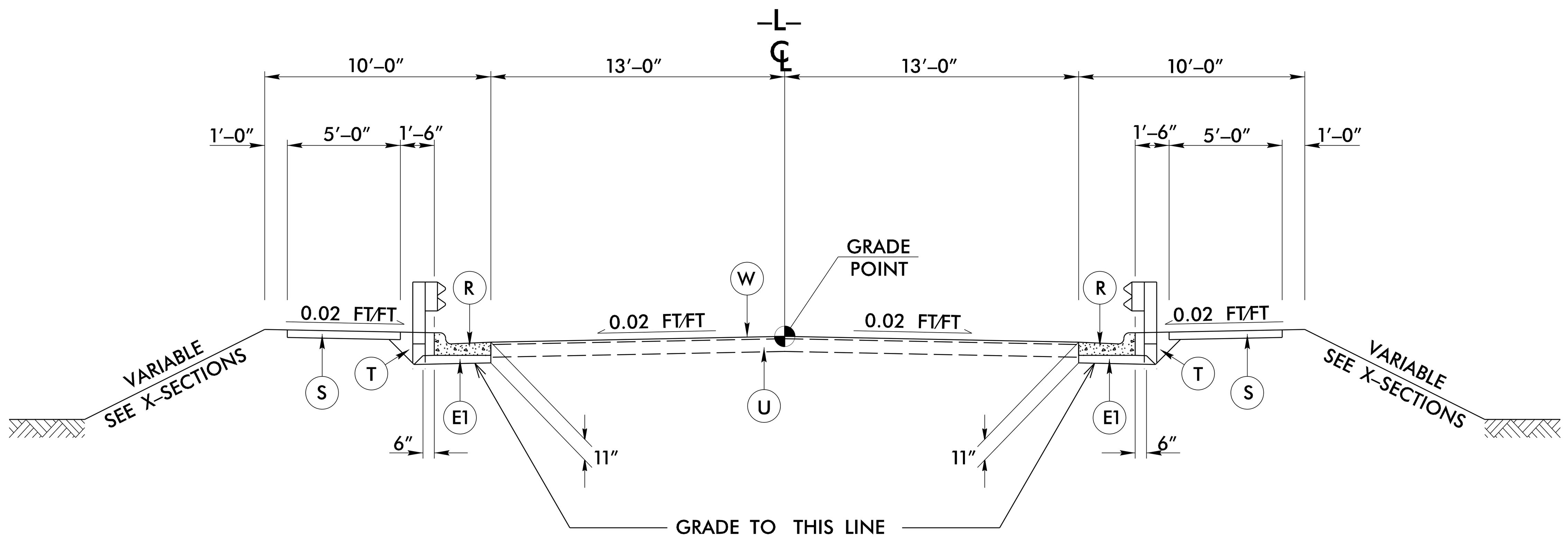
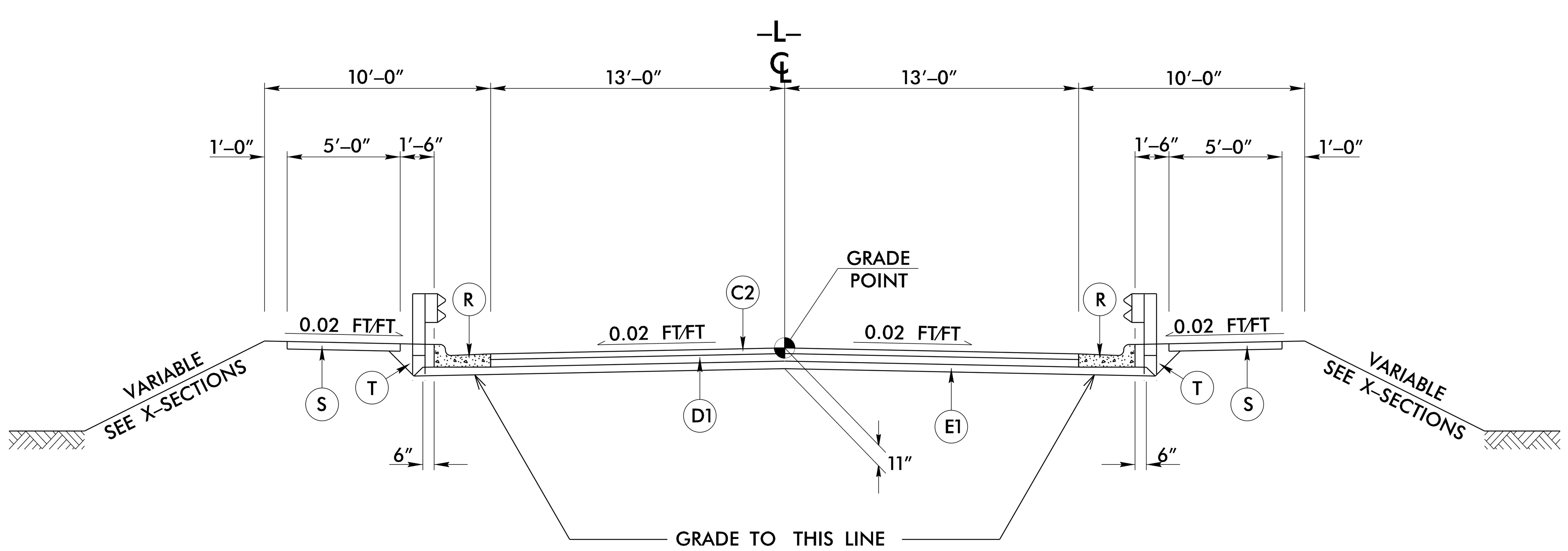


TYPICAL SECTION NO. 1

TRANSITION FROM EXISTING TO TYPICAL SECTION NO. 1:
–L– STA 10+50.00 TO 11+00.00

USE TYPICAL SECTION NO. 1:
–L– STA 11+00.00 TO 11+50.00
–L– STA 12+40.00 TO 12+50.00

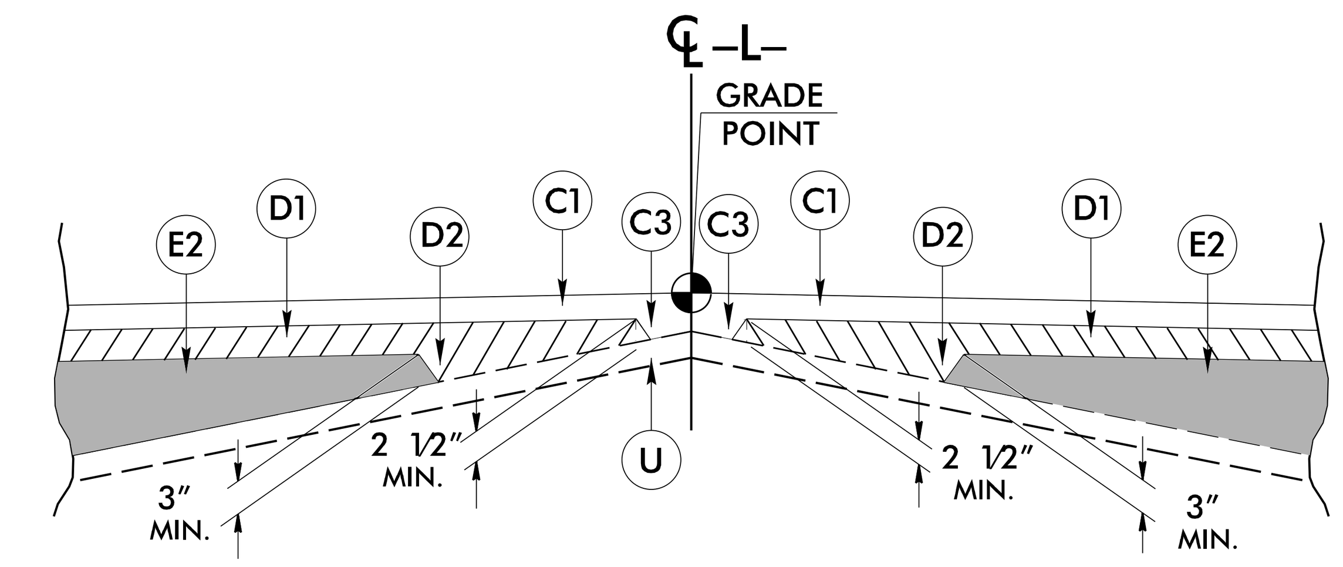
TRANSITION FROM TYPICAL SECTION NO. 1 TO EXISTING:
–L– STA 12+50.00 TO 13+00.00



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2:
–L– STA 11+50.00 TO 12+40.00

NOTE: 1) FOR VARIABLE SLOPES SEE CROSS SECTIONS.
2) SEE PLANS FOR TAPERS.



Detail Showing Method of Wedging

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1½″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1½″ IN DEPTH OR GREATER THAN 2″ IN DEPTH.
D1	PROP. APPROX. 4″ ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE BINDER COURSE. TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½″ IN DEPTH OR GREATER THAN 4″ IN DEPTH.
E1	PROP. APPROX. 4″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3″ IN DEPTH OR GREATER THAN 5½″ IN DEPTH.
R	2′-6″ CONCRETE CURB & GUTTER
S	4″ CONCRETE SIDEWALK
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	WEDGING (SEE DETAIL SHOWING METHOD OF WEDGING).

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

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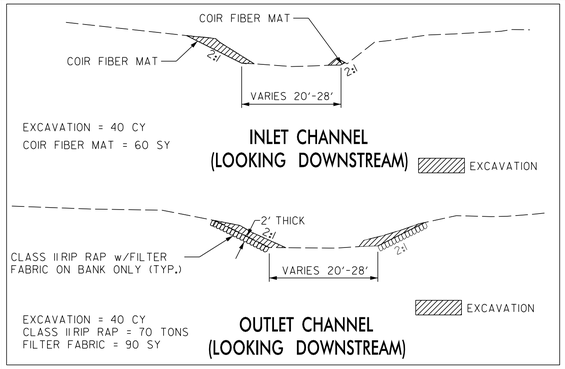

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "400895-2" WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 812941.1230(ft) EASTING: 1706652.8590(ft) ELEVATION: 831.4800(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999183633
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "400895-2" TO -L- STATION 10+00.00 IS S 78° 43' 35.0" E 78.32'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

BENCHMARK DATA

BM1 ELEVATION = 816.83
N 813222 E 1707137
BL STATION 12+59.00
N 36°39'20.40" E DIST 330.99
RR SPIKE SET IN BASE 12" PIN OAK

BASELINE DATA

BL POINT	DESC.	NORTH	EAST	ELEVATION	BL STATION	OFFSET
1	400895-1	812800.6010	1706201.9800	856.36	5+00.00	0.00
2	400895-2	812941.1230	1706652.8590	831.48	9+72.27	0.00
3	BL-3	812956.6320	1706939.6100	814.72	12+59.44	0.00

PROJECT REFERENCE	SHEET NO.
17BP.7.R.22 – GUILFORD #895	4

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JOHNSON
11/30/2015

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19732 ENGINEER STEPHEN FIH
11/30/2015

HATCH MOTT MACDONALD I & E, LLC
LICENSE NO. F-0669

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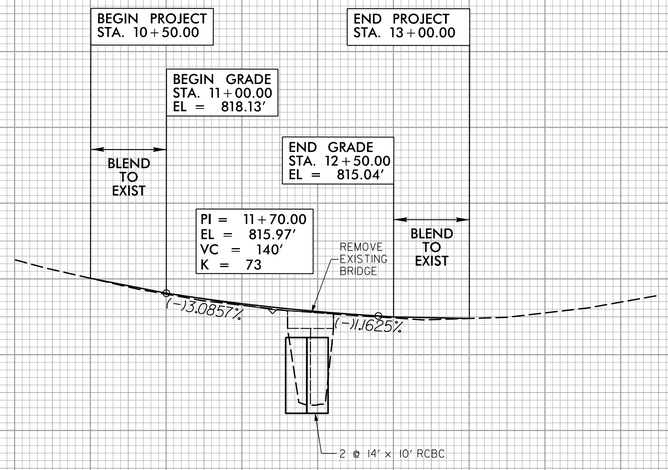
ICA Engineering, 5121 Kingdom Way, Suite 100, Raleigh, NC 27607, NC License No: P0258

VERTICAL SCALE 5' 0 5' 10'
HORIZONTAL SCALE 25' 0 25' 50'

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 2170	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 813.0	FT
BASE DISCHARGE	= 2560	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 814.47	FT
OVERTOPPING DISCHARGE	= 2560	CFS
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING ELEVATION	= 814.7	FT
DATE OF SURVEY	= 5-24-12	
W.S. ELEVATION AT DATE OF SURVEY	= 804.0	FT



PROJECT REFERENCE	SHEET NO.
17BP.7.R.22 – GUILFORD #895	TCP–1

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21102 ENGINEER JAMES TIMOTHY JORDAN

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LICENSE NO. F–0669

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THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" – HIGHWAY DESIGN BRANCH– N.C. DEPARTMENT OF TRANSPORTATION – RALEIGH, N.C., DATED JANUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD.	TITLE
1101.03	TEMPORARY ROAD CLOSURES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES
1205.01	PAVEMENT MARKINGS – LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS – TWO– LANE AND MULTI –LANE ROADWAYS
1205.05	PAVEMENT MARKINGS – TURN LANES
1205.08	PAVEMENT MARKINGS – ARROW SYMBOLS
1261.01	GUARDRAIL AND BARRIER DELINEATORS – INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS – TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

TRAFFIC PATTERN ALTERATIONS

A) NOTIFY THE ENGINEER TWENTY ONE (21) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

B) PROVIDE PERMANENT SIGNING.

C) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF–SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

D) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF–SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

E) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

GENERAL NOTES (CON'T)

TRAFFIC CONTROL DEVICES

F) PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11–2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

PAVEMENT MARKINGS AND MARKERS

G) INSTALL PAVEMENT MARKINGS ON THE FINAL SURFACE.

PHASING

STEP 1: USING ROADWAY STANDARD DRAWING NUMBER 1101.03, SHEET 1 OF 9, AND SHEET TCP–2, PERFORM THE FOLLOWING:
- INSTALL ALL ROAD CLOSURE AND DETOUR SIGNING INCLUDING BARRICADES
- CLOSE SR 1486 (LEXINGTON AVENUE)
- PLACE TRAFFIC ONTO OFF– SITE DETOUR

STEP 2: REMOVE EXISTING BRIDGE #895 AND CONSTRUCT THE PROPOSED CULVERT AND APPROACHES AS SHOWN IN THE CONSTRUCTION PLANS.

STEP 3: INSTALL FINAL PAVEMENT MARKINGS.

STEP 4: REMOVE ALL TRAFFIC CONTROL SIGNING AND DEVICES AND RE–OPEN SR 1486 (LEXINGTON AVENUE) TO THE FINAL TRAFFIC PATTERN.

PAVEMENT MARKING

PAINT WHITE MINI–SKIP LINES (4")	50 LF
PAINT WHITE SOLID LANE LINE (4")	124 LF
PAINT YELLOW DOUBLE CENTER (4")	1000 LF
PAINT LEFT TURN ARROW	2 EA
PAINT COMBINATION STRAIGHT AND RIGHT TURN ARROW	2 EA

NOTE: QUANTITY INCLUDES 2 APPLICATIONS OF EACH

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PROJECT REFERENCE	SHEET NO.
17BP.7.R.22 – GUILFORD #895	TCP–2

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 21102 JAMES TIMOTHY JORDAN

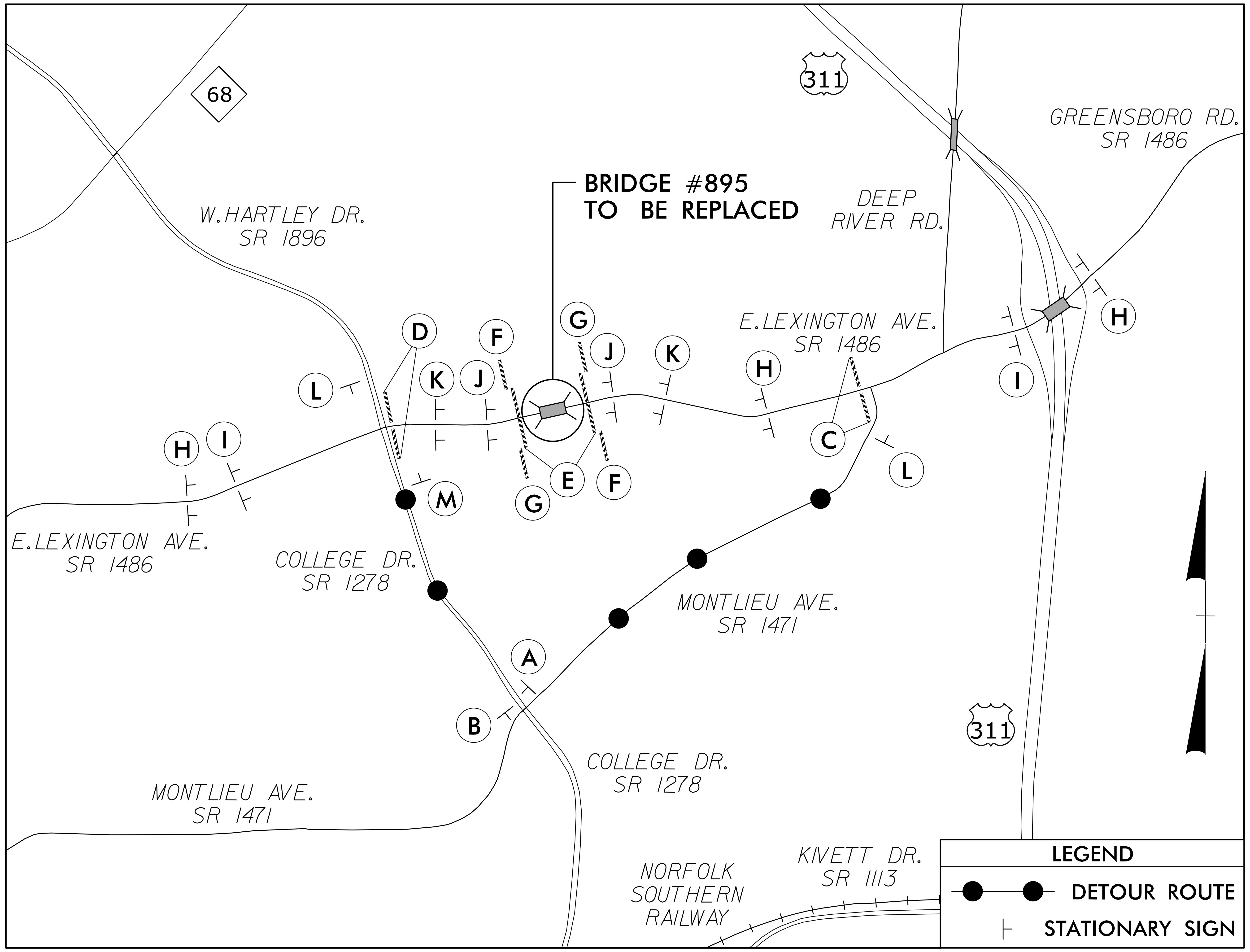
DocuSigned by: James Timothy Jordan

11/30/2015

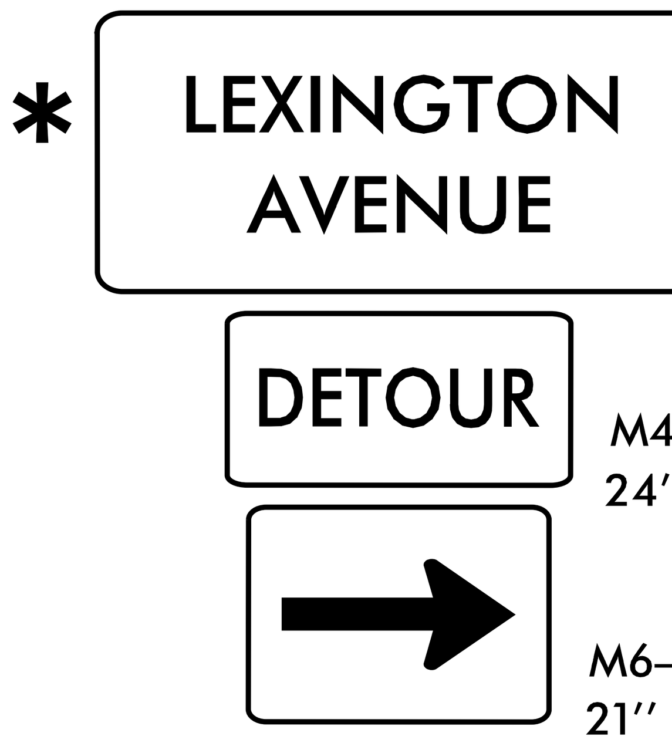
HATCH MOTT MACDONALD I & E, LLC
LICENSE NO. F–0669

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of: Hatch Mott MacDonald PO Box 700 Fuquay-Varina, NC 27526 www.hatchmott.com

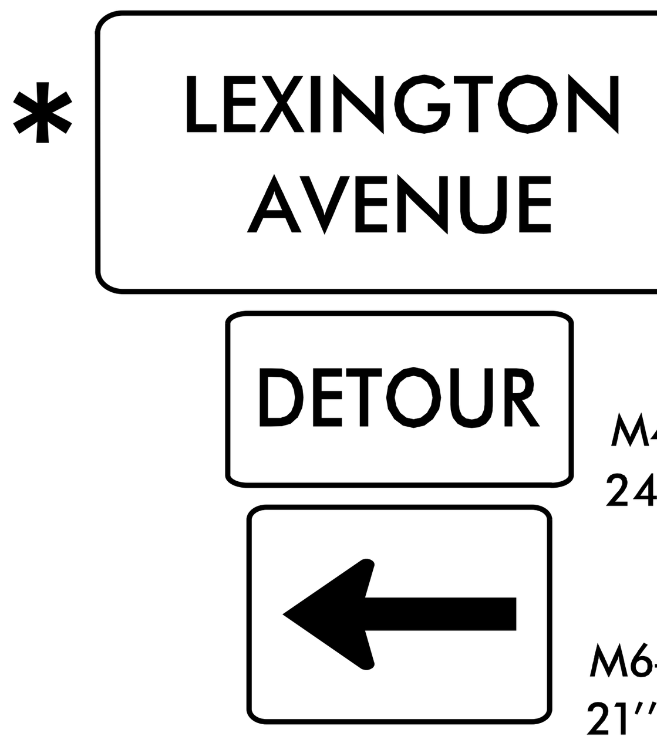


✱ SEE SHEET TCP–3 FOR SPECIAL SIGN DESIGNS



✱ M4–8 24″ X 12″ M6–1 R 21″ X 15″

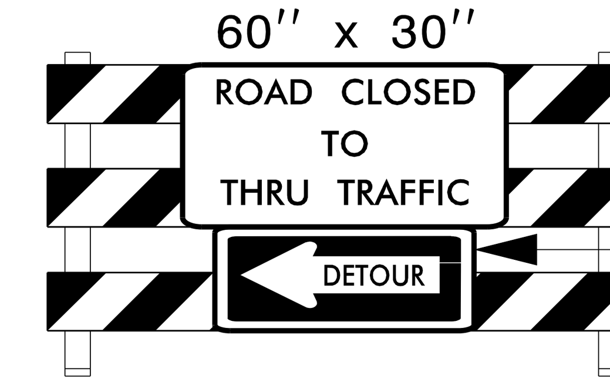
A



✱ M4–8 24″ X 12″ M6–1 L 21″ X 15″

B

R11-4 60″ x 30″

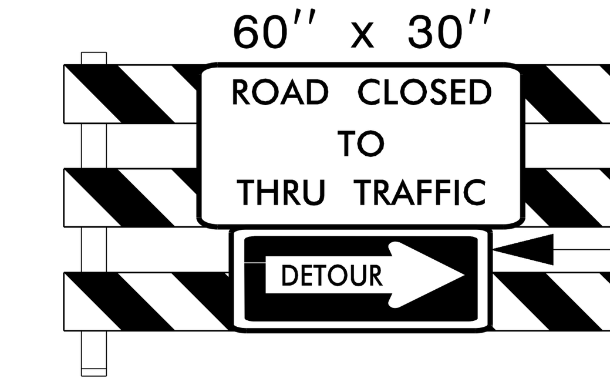


M4-10L 48″ x 18″

TYPE III BARRICADE

C

R11-4 60″ x 30″

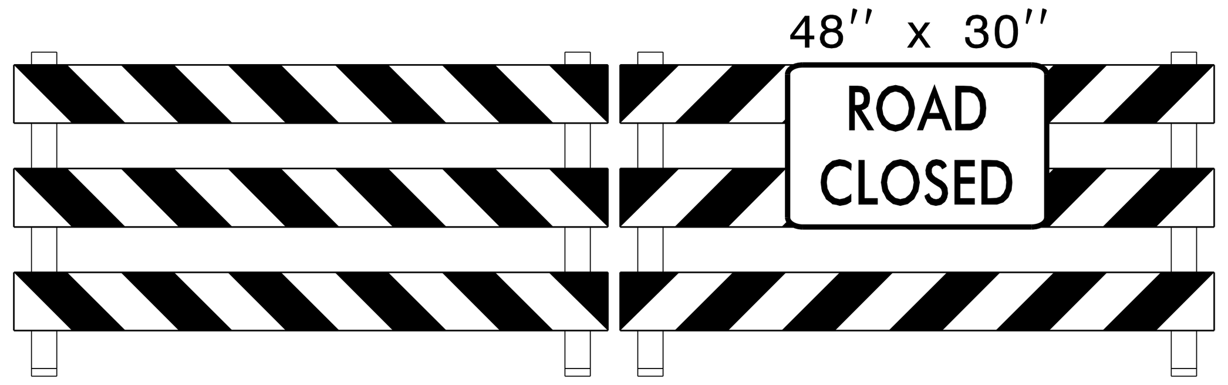


M4-10R 48″ x 18″

TYPE III BARRICADE

D

R11-2 48″ x 30″



TYPE III BARRICADE(S)

E

R9-9 24″ X 12″

TYPE III BARRICADE

F

R9-9 24″ X 12″

TYPE III BARRICADE

G

W20–3 48″ X 48″

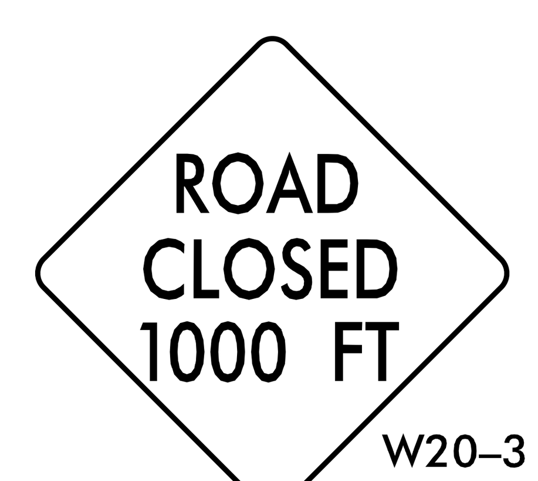
H

W20–2 48″ X 48″

I

W20–3 48″ X 48″

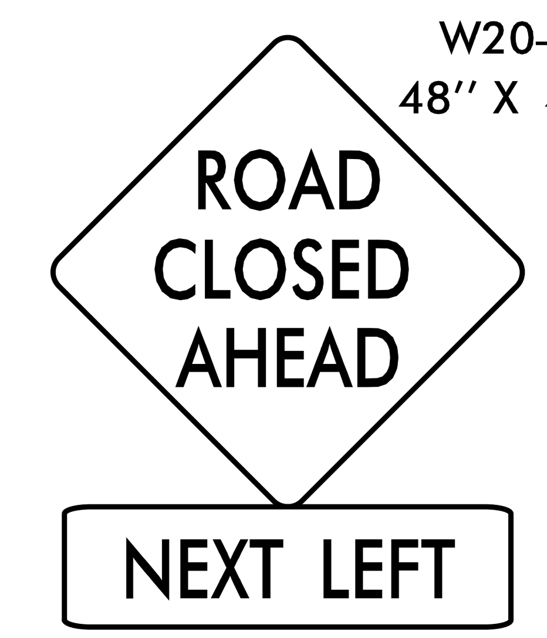
J



W20–3 48″ X 48″

K

W20–3 48″ X 48″



SP–4L 42″ X 12″

L

W20–3 48″ X 48″

SP–4R 42″ X 12″

M

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PROJECT REFERENCE	SHEET NO.
17BP.7.R.22 – GUILFORD #895	TCP-3

TRAFFIC
ENGINEER

NORTH CAROLINA
PROFESSIONAL
SEAL
023488
ENGINEER
NATHAN K. PHILLIPS

DocuSigned by:
[illegible]
BE55A...
12/15/2015

HATCH MOTT MACDONALD I & E, LLC
LICENSE NO. F-0669

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of: Hatch Mott MacDonald PO Box 700 Fuquay-Varina, NC 27526 www.hatchmott.com

SIGN NUMBER: SD-1
TYPE: D
QUANTITY: SEE PLANS

SIGN WIDTH: 4′-0″
HEIGHT: 2′-6″
TOTAL AREA: 10.0 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0.47″
WIDTH: 0.63″
RADII: 1.5″

NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

SYMBOL	X	Y	WID	HT

MAT′L: 0.125″ (3.2 mm) ALUMINUM

DESIGN BY: BLP
PROJECT ID: 17BP.7.R.22
CHECKED BY: NKP
DIV: 7
DATE: Oct 11, 2013

BORDER
R=1.5″
TH=0.63″
IN=0.47″

USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B fluoresent orange retroreflective sheeting.

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter locations are panel edge to lower left corner

										Series/Size Text Length
	L	E	X	I	N	G	T	O	N	C 2000
	6.7	10.6	14.2	18.6	20.8	25.3	29.4	33.2	37.9	34.6
	A	V	E	N	U	E				C 2000
	11.4	15.6	20.1	24.2	28.9	33.6				25.3

FILENAME: 400895_rdy_SD1

NORTH CAROLINA D.O.T. SIGN DETAIL

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17BP.7.R.22

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.7.R.22	EC-1	

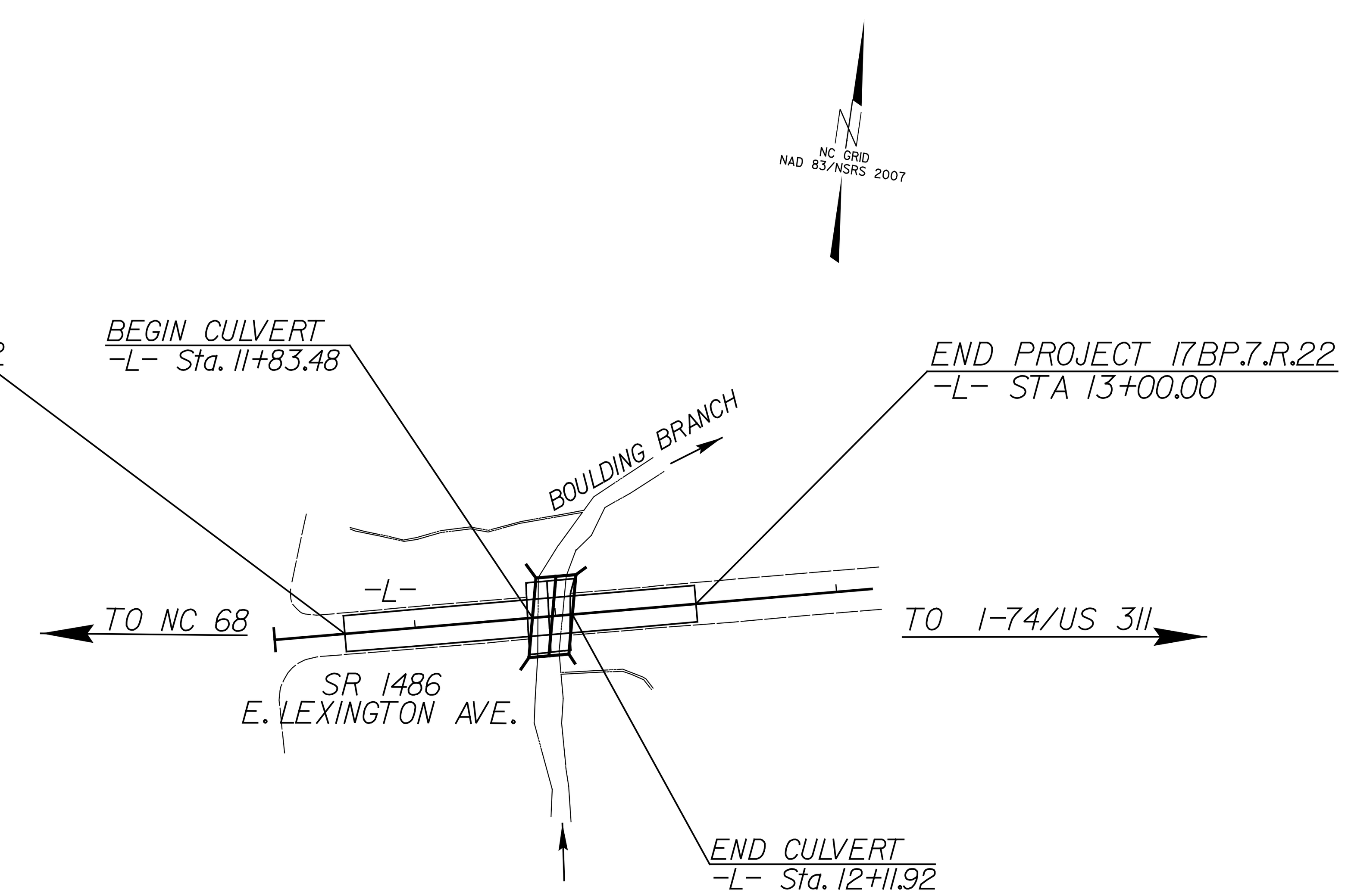
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

GUILFORD COUNTY

BRIDGE NO. 895 ON SR 1486
OVER BOULDING BRANCH



EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	TSD
1630.05	Temporary Diversion	TD
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
1633.02	Temporary Rock Silt Check Type-B	
	Wattle/ Coir Fiber Wattle	
	Wattle/ Coir Fiber Wattle with Polyacrylamide (PAM)	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1630.04	Stilling Basin	
1630.06	Special Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C
	Skimmer Basin	
	Tiered Skimmer Basin	
	Infiltration Basin	

THIS PROJECT CONTAINS EROSION CONTROL PLANS FOR CLEARING AND GRUBBING PHASE OF CONSTRUCTION.

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

Refer To E. C. Special Provisions for Special Considerations.

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258
f/k/a Florence & Hutcheson, Inc.

GRAPHIC SCALE

25 0 50
PLANS

25 0 50
PROFILE (HORIZONTAL)

5 0 10
PROFILE (VERTICAL)

ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

LEVEL III CERTIFIED BY:
ALEXANDER SNIDER, E.I.
CERTIFICATION NUMBER: 3064
ISSUED: MARCH 7, 2014

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 3, 2011 ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER QUALITY.

Prepared In the Office of:
ICA ENGINEERING
5121 KINGDOM WAY, SUITE 100
RALEIGH NC 27607
NC License No: F-0258

2012 STANDARD SPECIFICATIONS

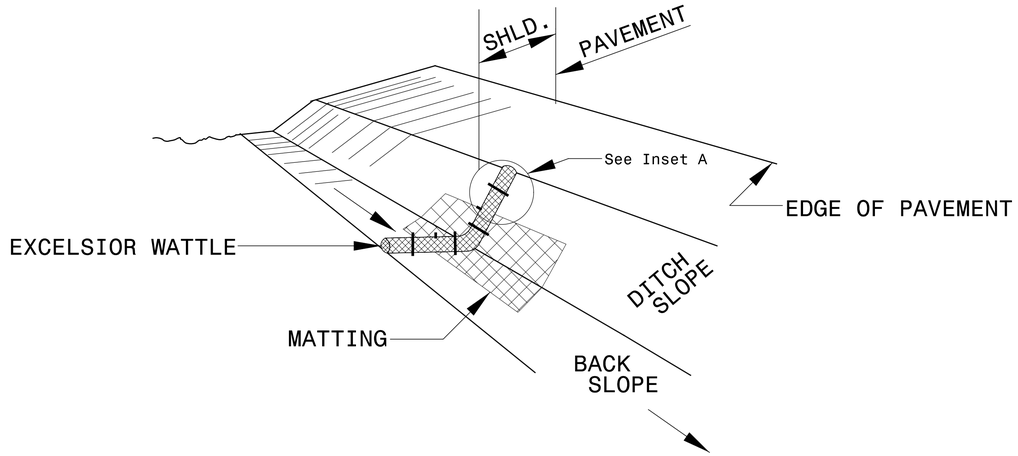
Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 2012 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01	Railroad Erosion Control Detail	1632.01	Rock Inlet Sediment Trap Type A
1605.01	Temporary Silt Fence	1632.02	Rock Inlet Sediment Trap Type B
1606.01	Special Sediment Control Fence	1632.03	Rock Inlet Sediment Trap Type C
1607.01	Gravel Construction Entrance	1633.01	Temporary Rock Silt Check Type A
1622.01	Temporary Berms and Slope Drains	1633.02	Temporary Rock Silt Check Type B
1630.01	Riser Basin	1634.01	Temporary Rock Sediment Dam Type A
1630.02	Silt Basin Type B	1634.02	Temporary Rock Sediment Dam Type B
1630.03	Temporary Silt Ditch	1635.01	Rock Pipe Inlet Sediment Trap Type A
1630.04	Stilling Basin	1635.02	Rock Pipe Inlet Sediment Trap Type B
1630.05	Temporary Diversion	1640.01	Coir Fiber Baffle
1630.06	Special Stilling Basin	1645.01	Temporary Stream Crossing
1631.01	Matting Installation		

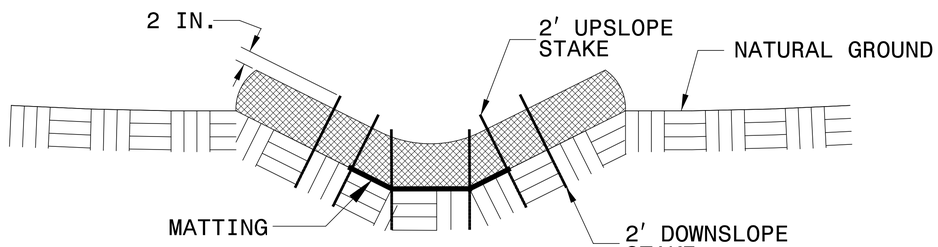
PROJECT REFERENCE NO.	SHEET NO.
17BP.7.R.22	EC-2

WATTLE DETAIL



ISOMETRIC VIEW

CROSS SECTION VEE DITCH



CROSS SECTION TRAPEZOIDAL DITCH

NOTES:

USE MINIMUM 12 IN. DIAMETER EXCELSIOR WATTLE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

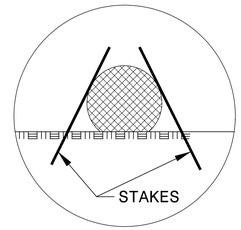
ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.

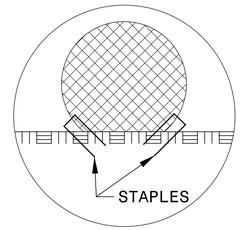
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

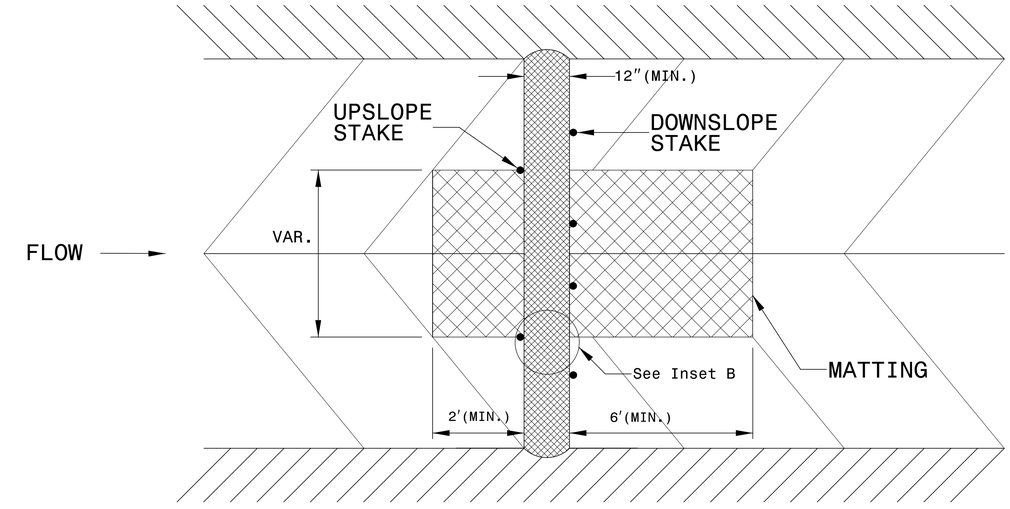
INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.



INSET A



INSET B



TOP VIEW

PROJECT REFERENCE NO.	SHEET NO.
17BP.7.R.22	EC-3

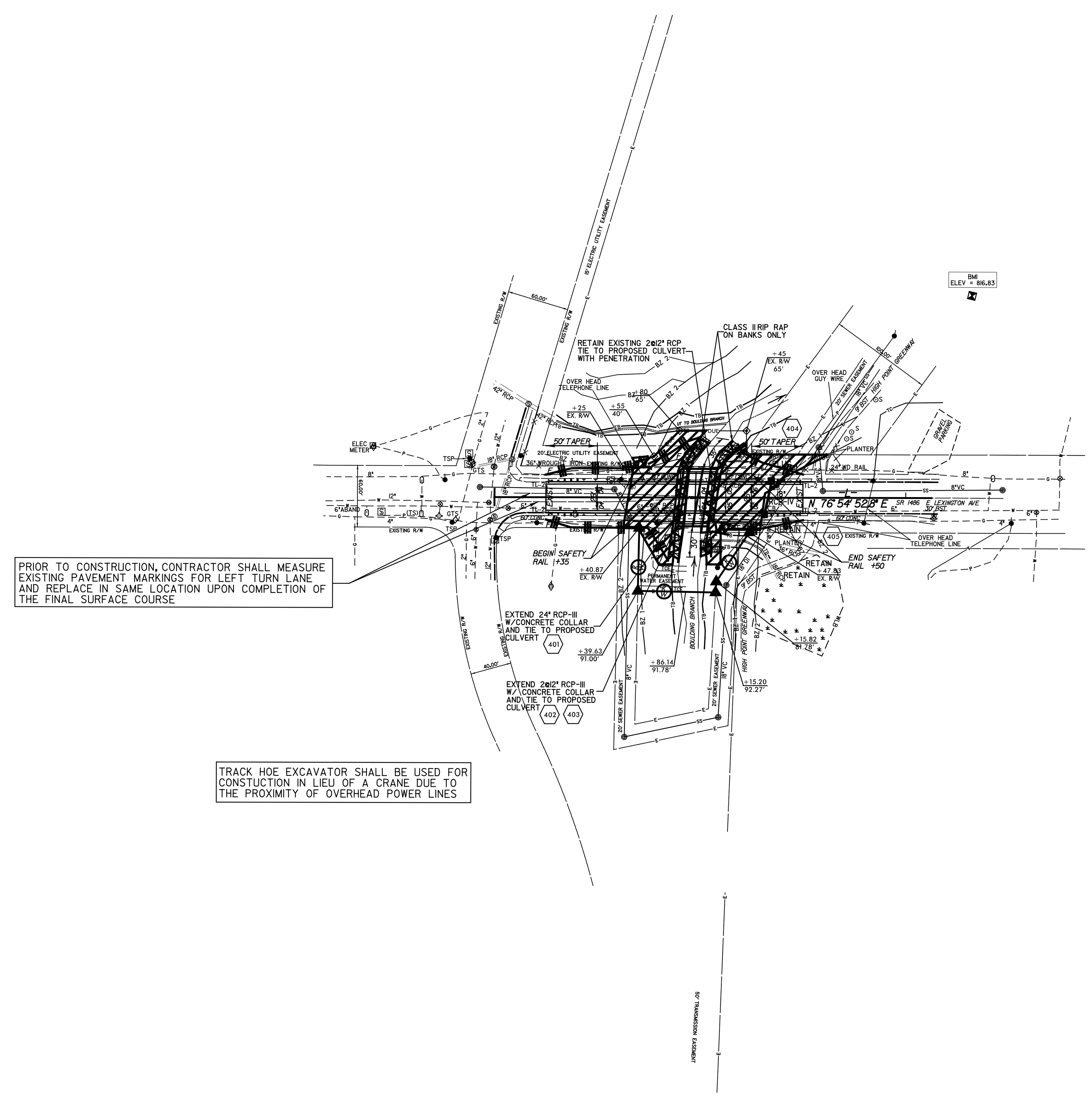
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.

CLEARING AND GRUBBING EROSION CONTROL

NC GRID
NAD 83/NSRS 2007



▨	ENVIRONMENTALLY SENSITIVE AREA SEE PROJECT SPECIAL PROVISIONS

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 4

NOTE:
ALL EROSION CONTROL DEVICES SHOWN ARE LOCATED WITHIN EXISTING/PROPOSED R/W OR EASEMENT.

GRAPHIC SCALE
50 0 50 100

PROJECT REFERENCE NO.	SHEET NO.
I7BP.7.R.22	EC-4/CONST.4
R/W SHEET NO.	
ROADSIDE ENVIRONMENTAL PROJECT ENGINEER	

LEVEL III CERTIFIED BY:
ALEXANDER SNIDER, E.I.
CERTIFICATION NUMBER: 3064
ISSUED: MARCH 7, 2014

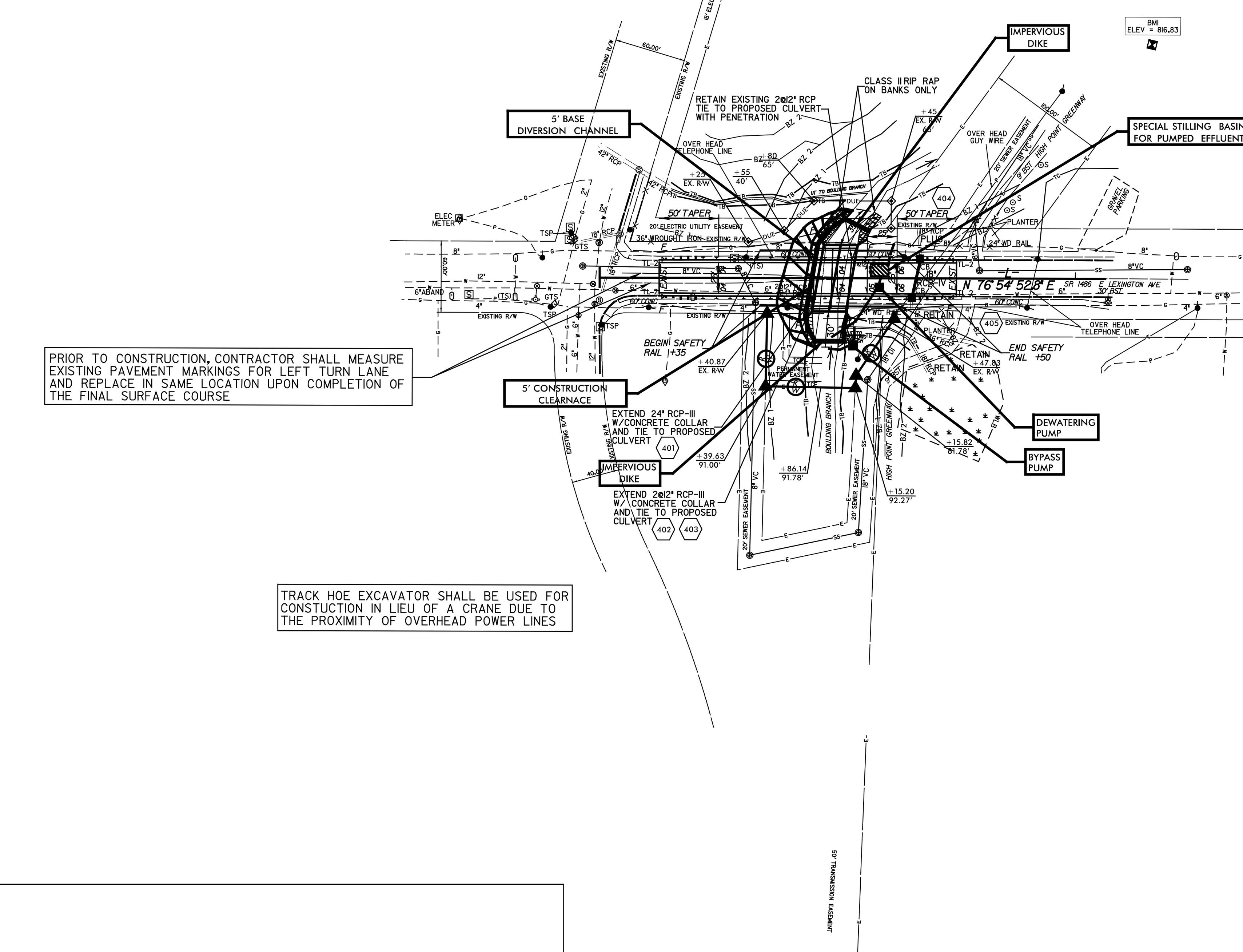
CONSTRUCTION SEQUENCE

CONSTRUCTION SEQUENCE (STA. 11+97 –L–)

(ROAD CLOSURE – MAINTENANCE OF TRAFFIC VIA OFFSITE DETOUR.)

1. REMOVE EXISTING BRIDGE.
2. CONSTRUCT SPECIAL STILLING BASINS FOR PUMPED EFFLUENT (10' X 15' MIN) FROM DEWATERED SITE.
3. INSTALL IMPERVIOUS DIKES.
4. DIVERT MAIN CHANNEL (BOULDING BRANCH) FLOW AROUND CONSTRUCTION SITE VIA 5' BASE DIVERSION CHANNEL.
5. DIVERT INTERMINTTENT STREAM (UT TO BOULDING BRANCH) WITH IMPERVIOUS DIKE AND BYPASS PUMP TOWARD DIVERSION CHANNEL.
6. INSTALL CULVERT AND HEADWALLS. BACKFILL CULVERT.
7. STABILIZE CHANNEL BANKS.
8. REMOVE IMPERVIOUS DIKES, SPECIAL STILLING BASIN, AND DIVERSION CHANNEL.
9. COMPLETE ROADWAY.

NC GRID
NAD 83/NSRS 2007



NOTES:

1. CULVERT CONSTRUCTION SHALL BE PERFORMED IN ONLY DRY OR ISOLATED SECTIONS OF CHANNEL.
2. IMPERVIOUS DIKES ARE TO BE USED TO ISOLATE WORK FROM STREAM FLOW AS NECESSARY.
3. ALL GRADED AREAS SHALL BE STABILIZED WITHIN 24 HOURS.
4. MAINTENANCE OF STREAM FLOW OPERATIONS SHALL BE INCIDENTAL TO THE WORK. THIS INCLUDES POLYETHYLENE SHEETING, DIVERSION PIPES, PUMPS AND HOSES.
5. PUMPS AND HOSES SHALL BE OF SUFFICIENT SIZE TO DEWATER THE WORK AREA.
6. THE CONTRACTOR SHALL NOT PUMP SEDIMENT–LADEN WATER DIRECTLY INTO STREAM. FOR DE–WATERING OF CULVERT SITES, THE CONTRACTOR SHALL FILTER SEDIMENT–LADEN WATER THROUGH SPECIAL STILLING BASIN.

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Raleigh, NC 27607
NC License No: F-0258
f/k/a Florence & Hutcheson, Inc.

PROJECT REFERENCE NO.	SHEET NO.
17BP.7.R.22	EC-5/CONST.4
R/W SHEET NO.	

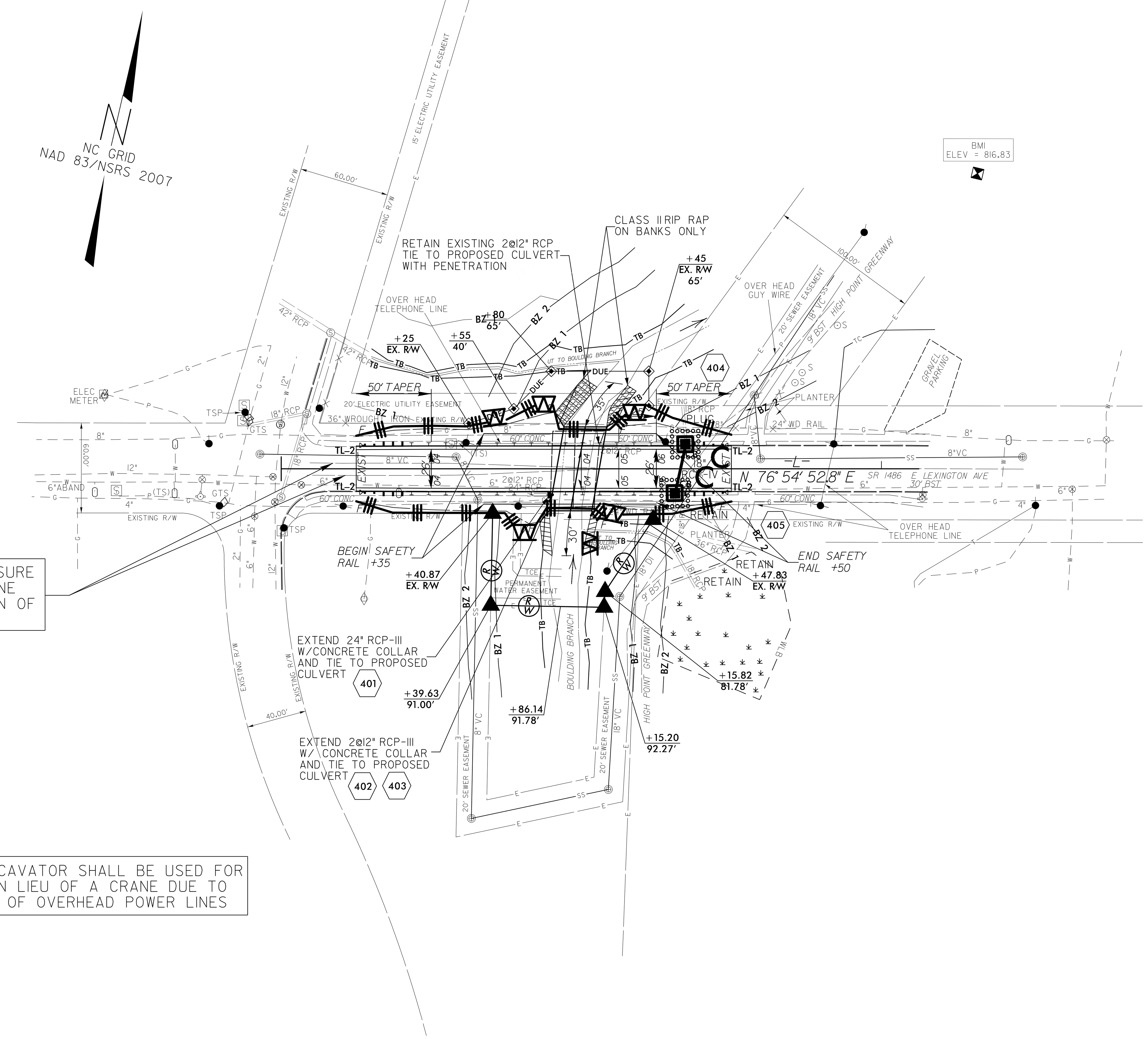
ROADSIDE ENVIRONMENTAL PROJECT ENGINEER

LEVEL III CERTIFIED BY:
ALEXANDER SNIDER, E.I.
CERTIFICATION NUMBER: 3064
ISSUED: MARCH 7, 2014

GRAPHIC SCALE

50 0 50 100

FINAL EROSION CONTROL FOR CONSTRUCTION SHEET 4



PRIOR TO CONSTRUCTION, CONTRACTOR SHALL MEASURE EXISTING PAVEMENT MARKINGS FOR LEFT TURN LANE AND REPLACE IN SAME LOCATION UPON COMPLETION OF THE FINAL SURFACE COURSE

TRACK HOE EXCAVATOR SHALL BE USED FOR CONSTUCTION IN LIEU OF A CRANE DUE TO THE PROXIMITY OF OVERHEAD POWER LINES

NOTE:
ALL EROSION CONTROL DEVICES SHOWN ARE LOCATED WITHIN EXISTING/PROPOSED R/W OR EASEMENT.

ICA Engineering
5121 Kingdom Way, Suite 100
Raleigh, NC 27607
NC License No: F-0258
f/k/a Florence & Hutcheson, Inc.

5/14/99

12/16/2014
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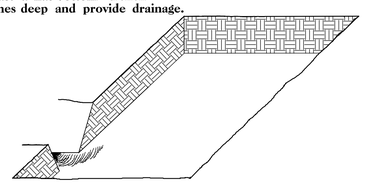
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.7.R.22	RF-1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	

PLANTING DETAILS

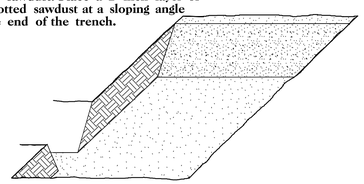
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

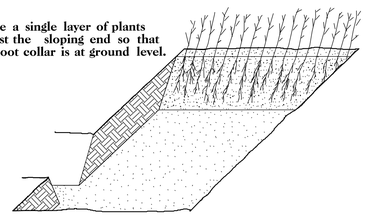
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



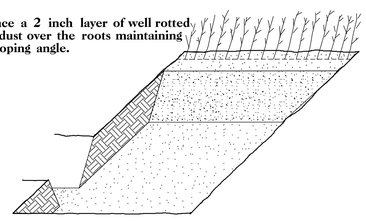
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

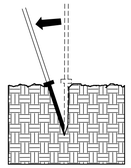


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

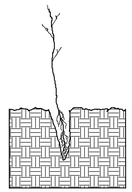


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

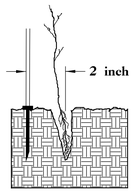
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



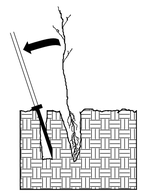
1. Insert planting bar as shown and pull handle toward planter.



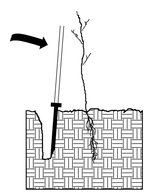
2. Remove planting bar and place seedling at correct depth.



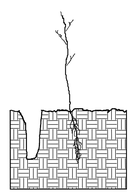
3. Insert planting bar 2 inches toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.



5. Push handle forward firming soil at top.



6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.

ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

REFORESTATION

☐ TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

25%	LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in – 18 in BR
25%	PLATANUS OCCIDENTALIS	SYCAMORE	12 in – 18 in BR
25%	FRAXINUS PENNSYLVANICA	GREEN ASH	12 in – 18 in BR
25%	BETULA NIGRA	RIVER BIRCH	12 in – 18 in BR

REFORESTATION DETAIL SHEET

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

PROJECT REFERENCE	SHEET NO.
17BP.7.R.22	U0-1

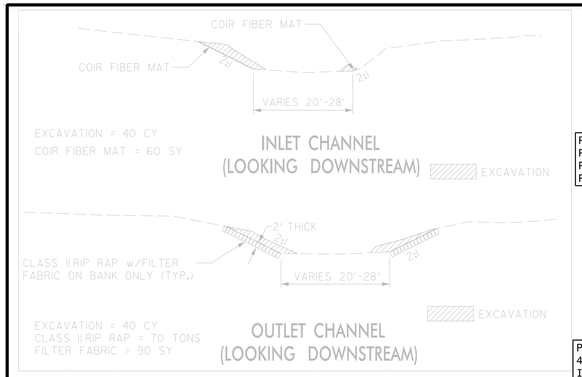
Prepared in the Office of:

THE WOOTEN COMPANY
LICENSE NO. F-0115
THE WOOTEN COMPANY
ENGINEERING | PLANNING | ARCHITECTURE
120 North Boylan Avenue Raleigh NC 27603-1423
919.828.0531 fax 919.834.3589

GRAPHIC SCALE
25' 0 25' 50'

UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "400895-2"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF
NORTHING: 812941.1230(ft) EASTING: 1706652.8590(ft)
ELEVATION: 831.4800(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999183633
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "400895-2" TO -L- STATION 10+00.00 IS
S 78° 43' 35.0" E 78.32'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

BENCHMARK DATA

BM1 ELEVATION - 816.83
N 813222 E 1707137
BL STATION 12+59.00
N 36°39'20.40" E DIST 330.99
RR SPIKE SET IN BASE 12" PIN OAK

BASELINE DATA

BL POINT	DESC.	NORTH	EAST	ELEVATION	BL STATION	OFFSET
1	400895-1	812800.6010	1706201.9800	856.36	5+00.00	0.00
2	400895-2	812941.1230	1706652.8590	831.48	9+72.27	0.00
3	BL-3	812956.6320	1706939.6100	814.72	12+59.44	0.00

Harris
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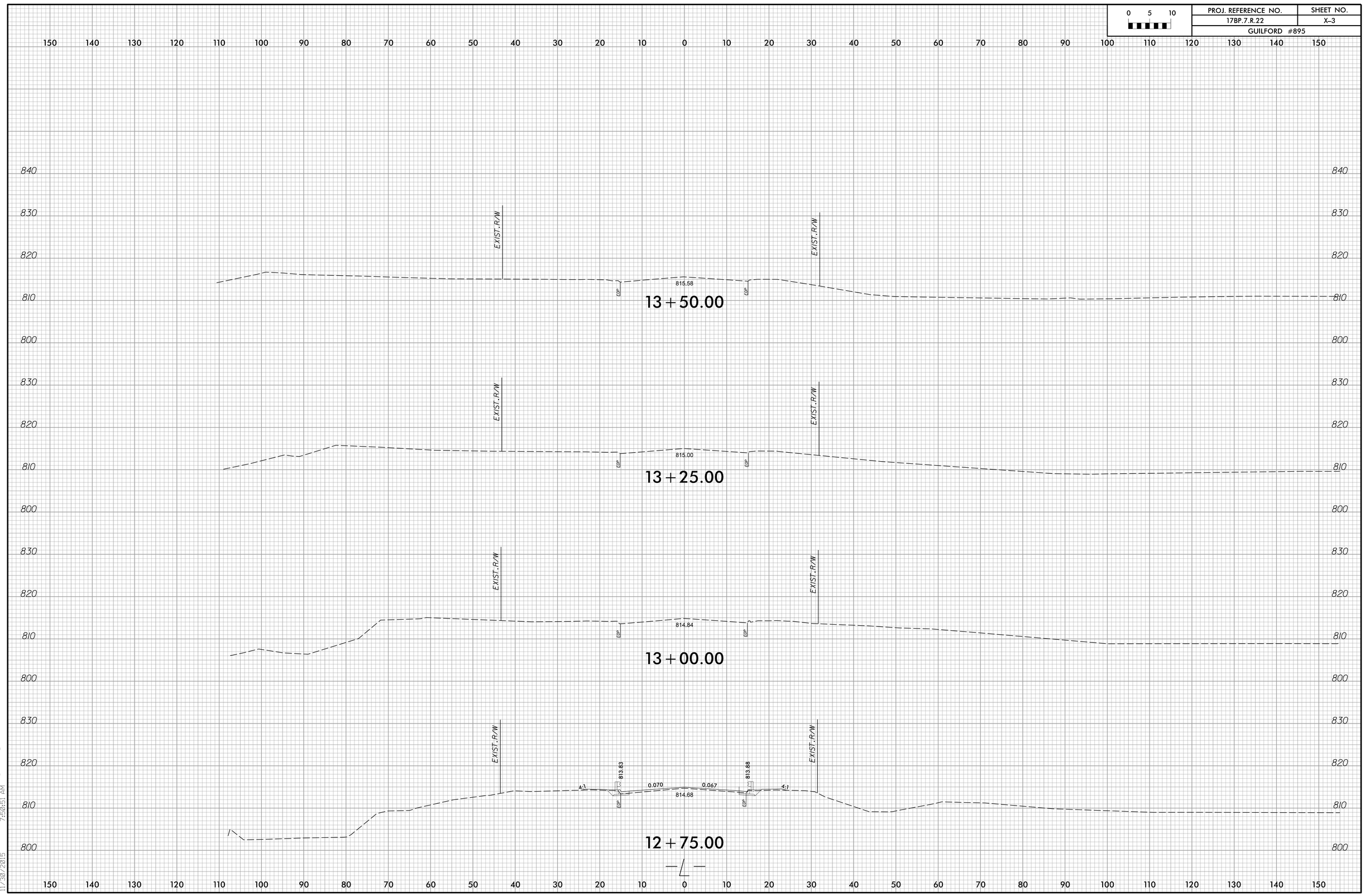
	17BP.7.R.22	X–3
	GUILFORD #895	



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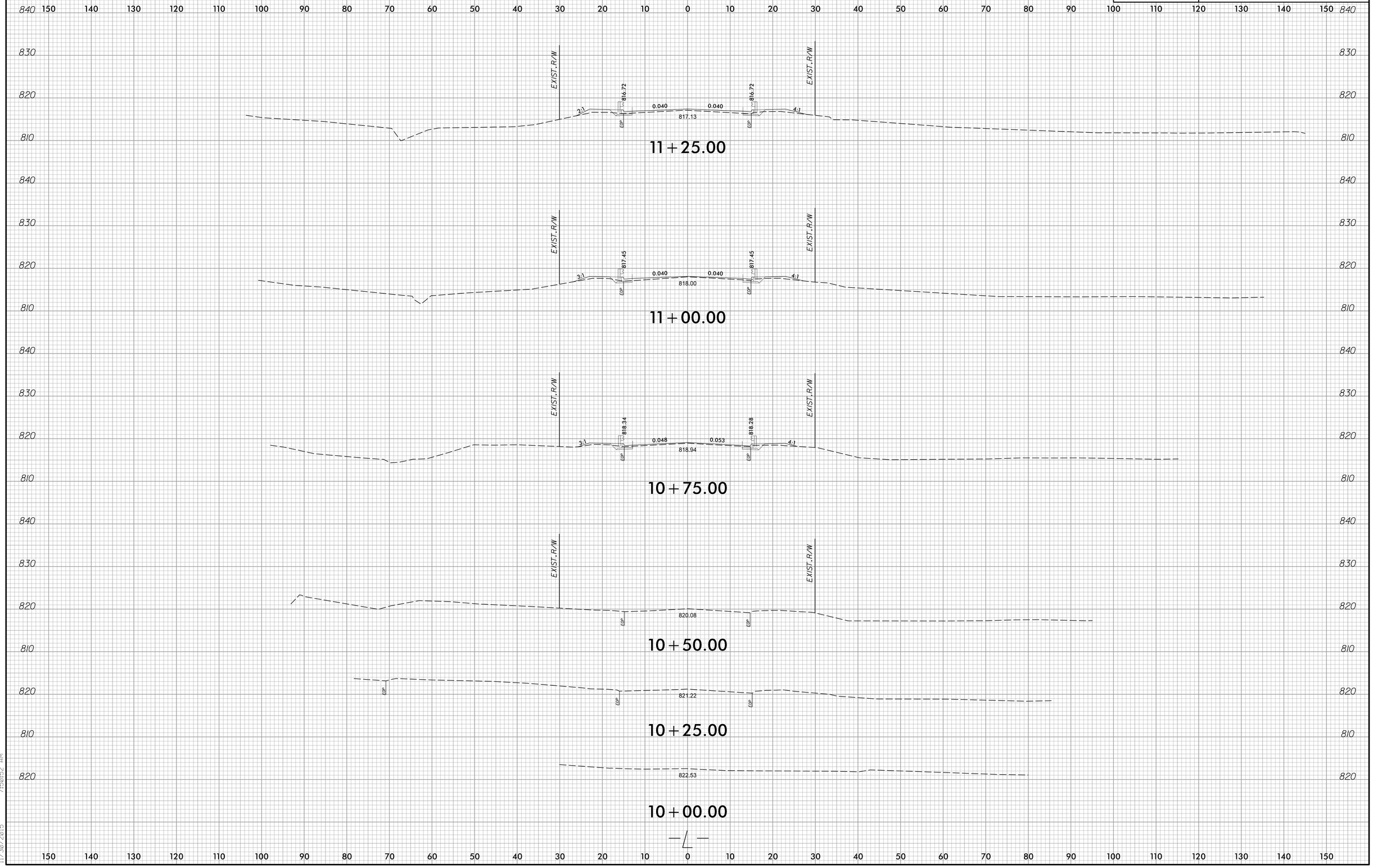
	17BP.7.R.22	X-1
	GUILFORD #895	



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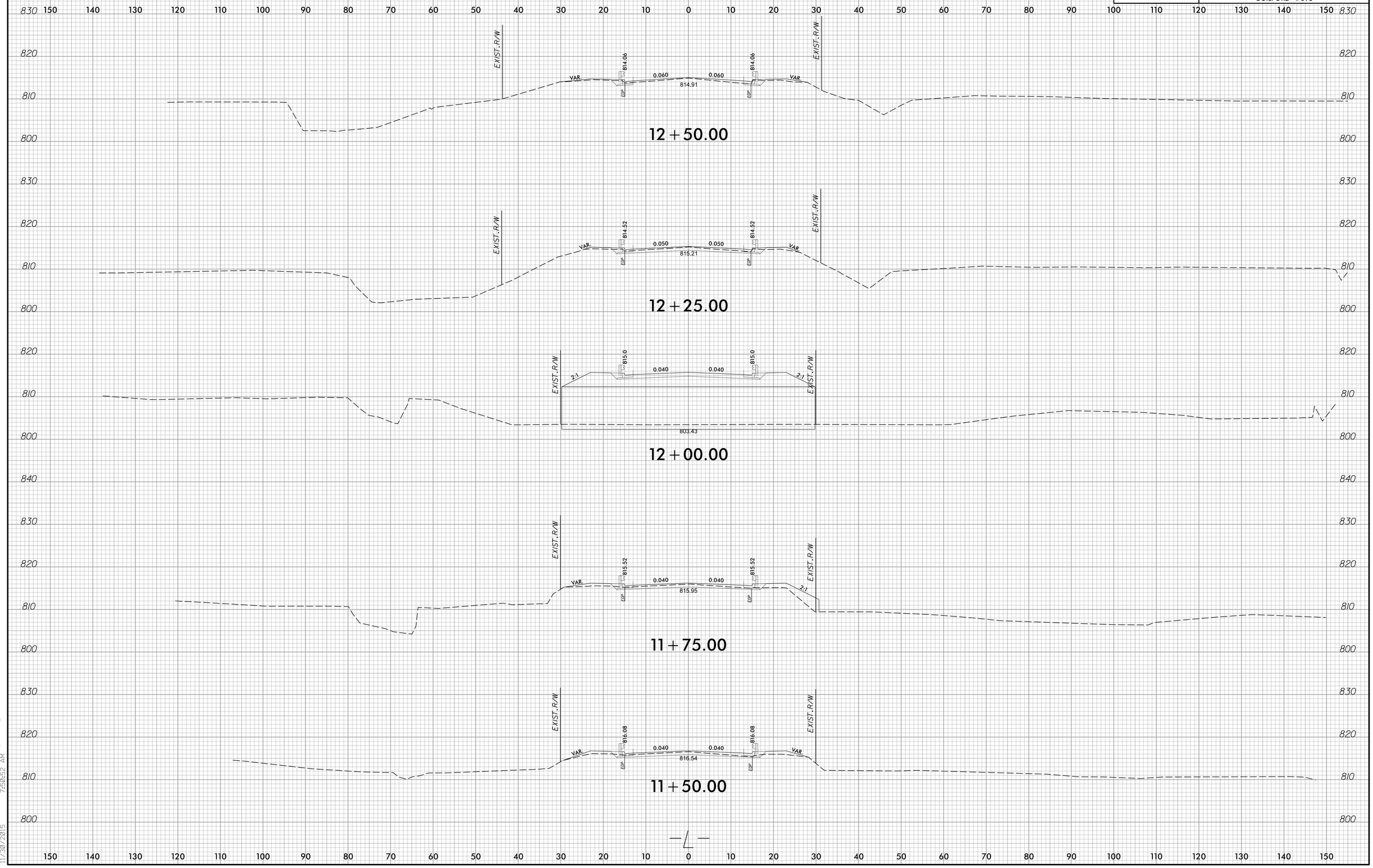
17BP.7.R.22	X–2
GUILFORD #895	

0 5 10



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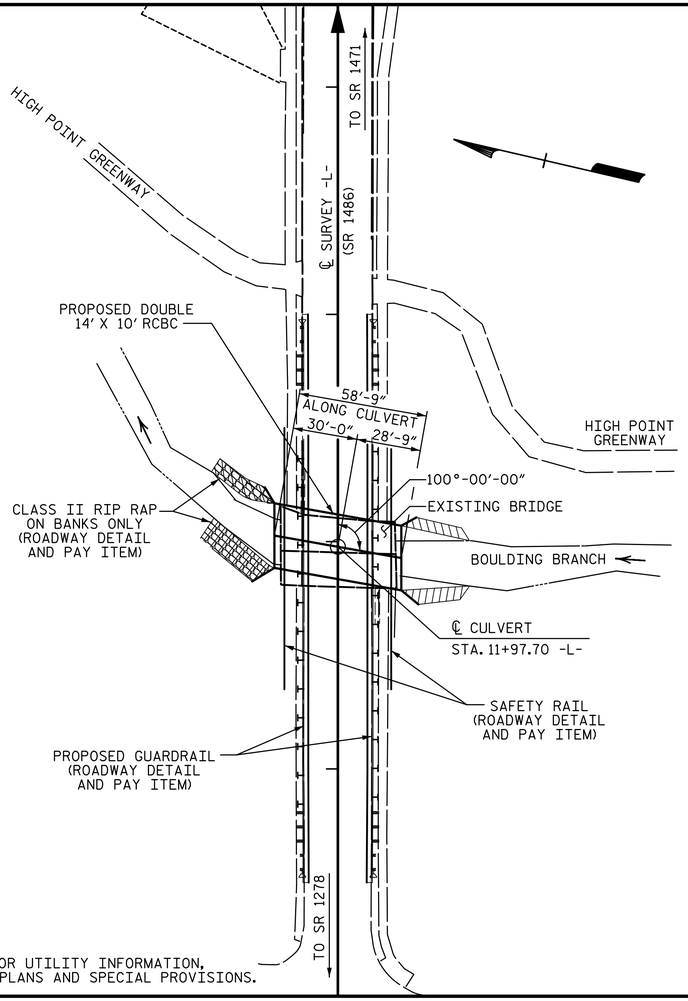
BENCH MARK: #1, RAILROAD SPIKE SET IN BASE 12" PIN OAK, STA. 12+59.00 -L-, DIST. 330.99' LT., EL. 816.83



LOCATION SKETCH

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE		
BARREL @ 3.240 CY/FT	190.4	C.Y.
HEADWALLS	2.9	C.Y.
WING ETC.	53.2	C.Y.
TOTAL	246.5	C.Y.
REINFORCING STEEL		
BARREL	43127	LBS.
WINGS ETC.	5799	LBS.
TOTAL	48926	LBS.
CULVERT EXCAVATION	LUMP SUM	
FOUNDATION CONDITIONING MATERIAL	141	TONS
REMOVAL OF EXISTING STRUCTURE	LUMP SUM	

HYDRAULIC DATA

DESIGN DISCHARGE	= 2170 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YEAR
DESIGN HIGH WATER ELEVATION	= 813.0
DRAINAGE AREA	= 2.3 SQ. MI.
BASE DISCHARGE (Q 100)	= 2560 CFS
BASE HIGH WATER ELEVATION	= 814.47

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 2560 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 100+ YEAR
OVERTOPPING FLOOD ELEVATION	= 814.7

GRADE DATA

GRADE POINT ELEV. @ STA 11+97.70 -L-	= 815.77
BED ELEV. @ STA. 11+97.70 -L-	= 802.22
ROADWAY FILL SLOPES	= 2:1

NOTES:

ASSUMED LIVE LOAD ----------HL-93 OR ALTERNATE LOADING.

DESIGN FILL----------2.50'

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

1. PHASE I WING FOOTINGS AND FLOOR SLAB INCLUDING 4"OF PHASE I VERTICAL WALLS.
2. THE REMAINING PORTIONS OF PHASE I WALLS AND WINGS FULL HEIGHT.
3. PHASE II WING FOOTINGS AND FLOOR SLAB INCLUDING 4"OF PHASE II VERTICAL WALLS.
4. THE REMAINING PORTIONS OF PHASE II WALLS AND PHASE II WINGS FULL HEIGHT.
5. ROOF SLAB AND HEADWALLS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

THE EXISTING STRUCTURE CONSISTING OF 2 CONTINUOUS SPANS, 1 @ 15'-10½" AND 1 @ 16'-0" WITH CLEAR ROADWAY WIDTH OF 30'-0", REINFORCED CONCRETE DECK SLAB WITH AWS ON REINFORCED CONCRETE ABUTMENTS AND INTERIOR BENT WITH REINFORCED CONCRETE CAP, COLUMNS AND PEDESTALS AND STEEL CAP AND PILES AND CONCRETE PEDESTALS AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

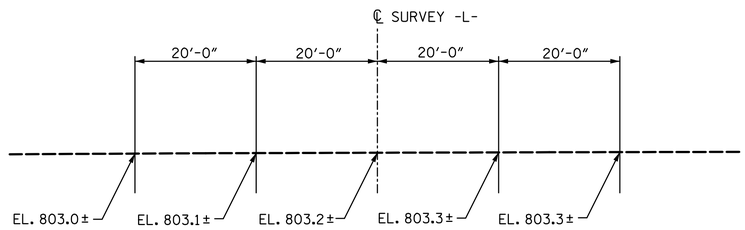
FOR CONSTRUCTION SEQUENCE, SEE EROSION CONTROL PLANS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF EXPANSION JOINT.



PROFILE ALONG ℄ CULVERT

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. 17BP.7.R.22

GUILFORD COUNTY

STATION: 11+97.70 -L-

SHEET 1 OF 7 REPLACES BRIDGE NO. 895

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:

SIMPSON ENGINEERS & ASSOCIATES
5640 Dillard Drive
Suite 200
Cary, NC 27518
(919) 852-0468
(919) 852-0598 (Fax)
www.simpsonengr.com
LICENSURE NO. C-2521

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037857 CESAR O. CUEVAS

12/2/2015

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 14 FT. X 10 FT. CONCRETE BOX CULVERT 100° SKEW

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. C-1

TOTAL SHEETS 7

DRAWN BY: D.G.VESTER DATE: 12/15
CHECKED BY: B.S. COX DATE: 12/15
DESIGN ENGINEER OF RECORD: C.O. CUEVAS DATE: 12/15

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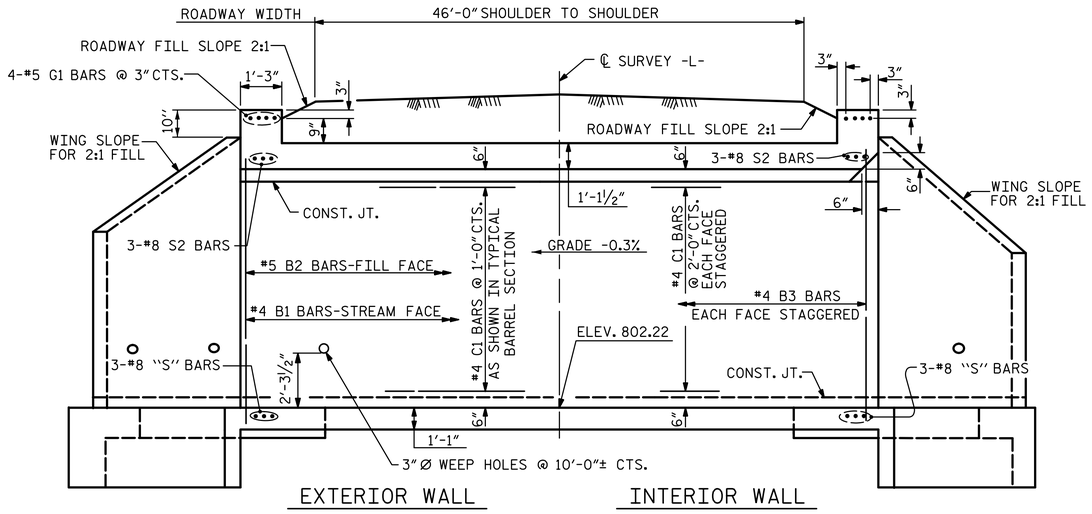
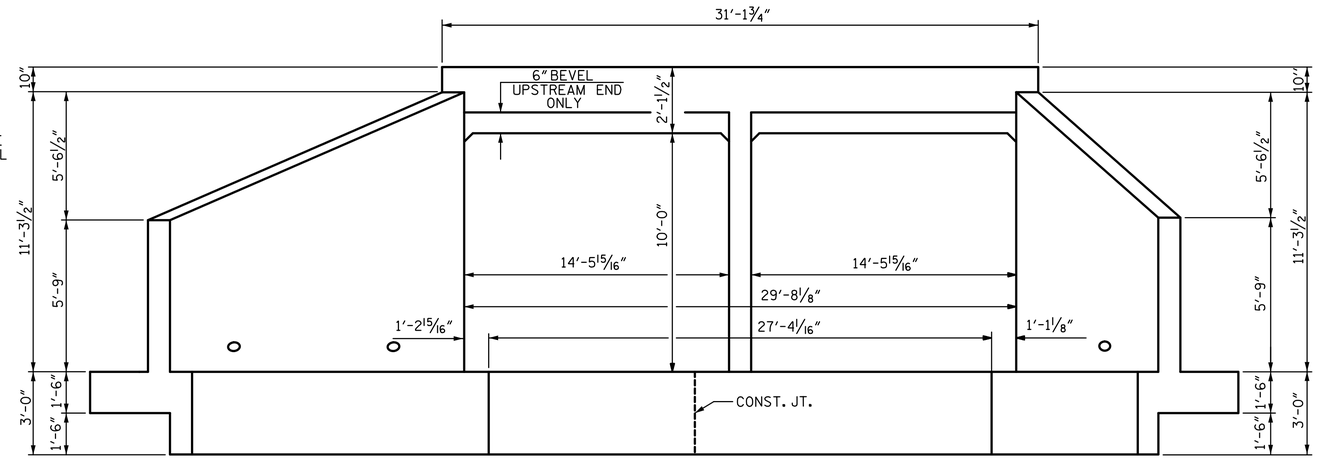
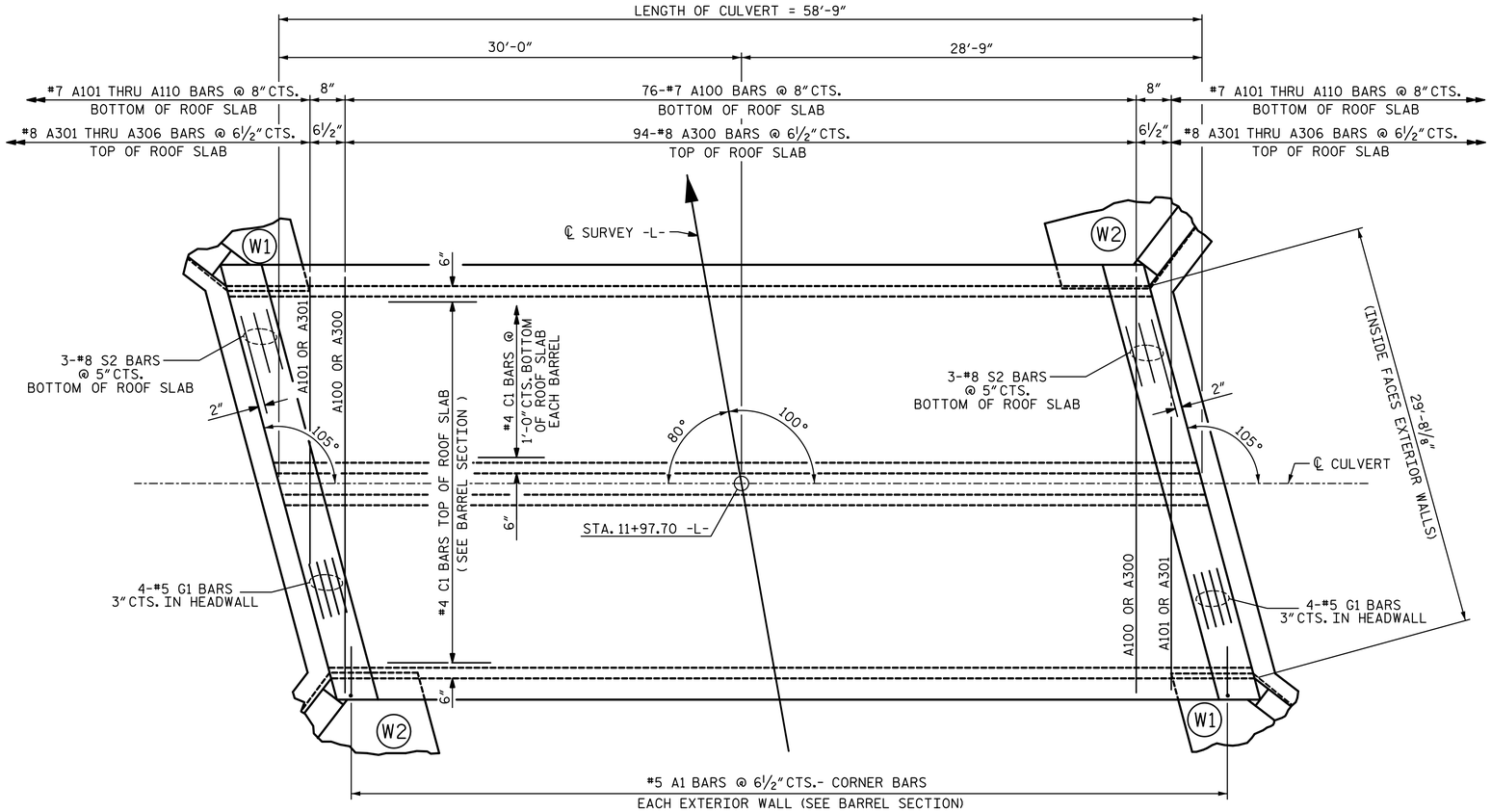


CULVERT SECTION NORMAL TO ROADWAY



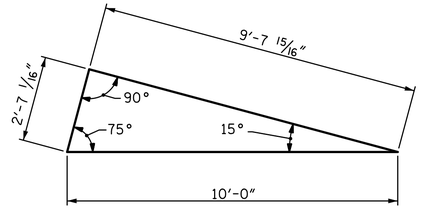
END ELEVATION NORMAL TO SKEW

(LOOKING DOWNSTREAM)



PLAN - ROOF SLAB

(C1 BARS ARE 3 BAR RUNS)



SKEW TRIANGLE

PROJECT NO. 17BP.7.R.22

GUILFORD COUNTY

STATION: 11+97.70 -L-

SHEET 2 OF 7

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LICENSURE NO. C-2521

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037857 CESAR O. CUEVAS — 12/2/2015

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 14 FT. X 10 FT. CONCRETE BOX CULVERT 100° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2
1			3			TOTAL SHEETS
2			4			7

DRAWN BY:	D.G.VESTER	DATE: 12/15
CHECKED BY:	B.S. COX	DATE: 12/15
DESIGN ENGINEER OF RECORD:	C.O. CUEVAS	DATE: 12/15

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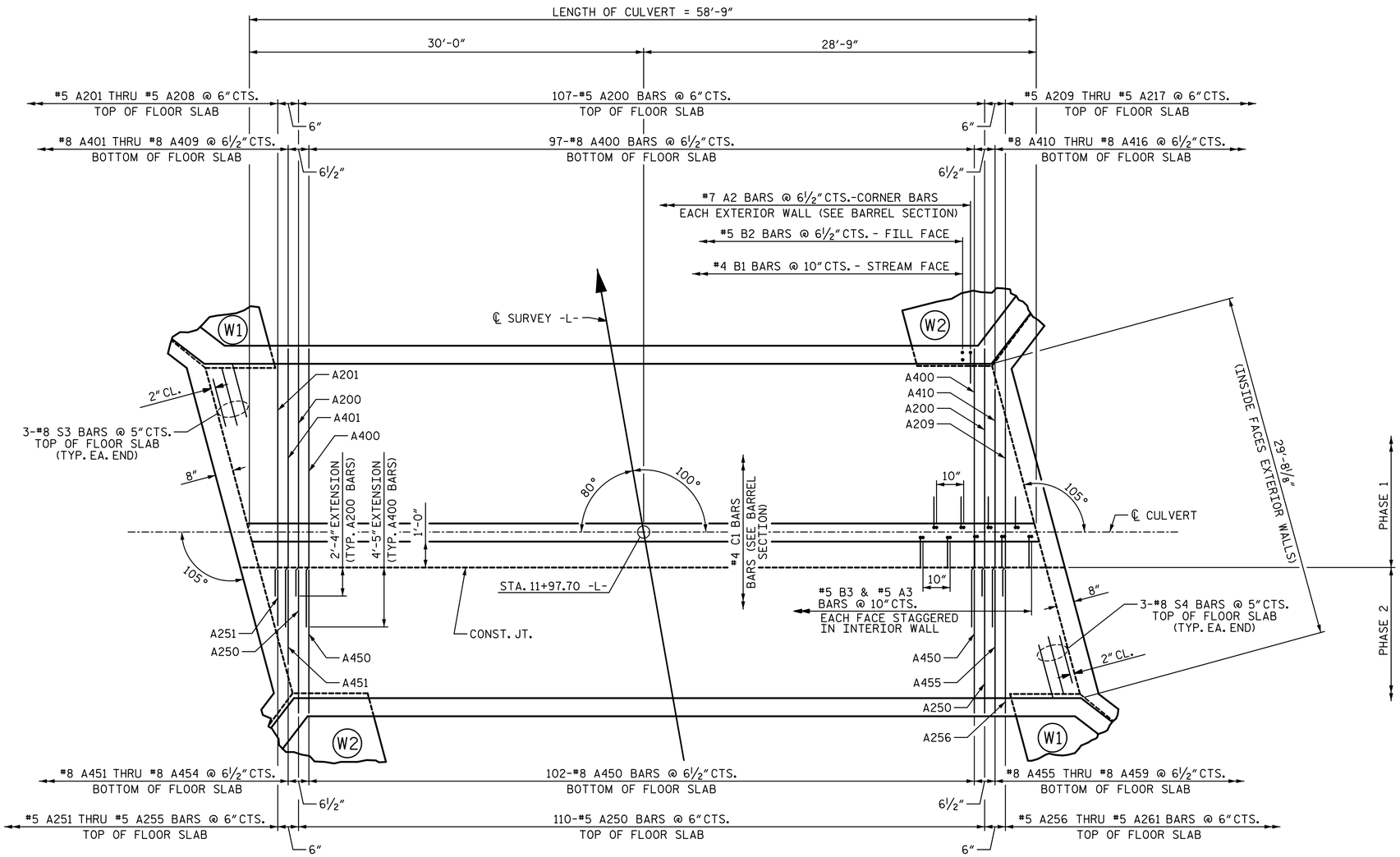
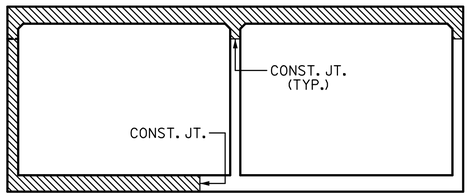


PLAN - FLOOR SLAB

(C1 BARS ARE 3 BAR RUNS)



PHASING SEQUENCE

(LOOKING DOWNSTREAM)

PROJECT NO. 17BP.7.R.22

GUILFORD COUNTY

STATION: 11+97.70 -L-

SHEET 3 OF 7

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 14 FT. X 10 FT. CONCRETE BOX CULVERT 100° SKEW

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1			3			TOTAL SHEETS
2			4			7

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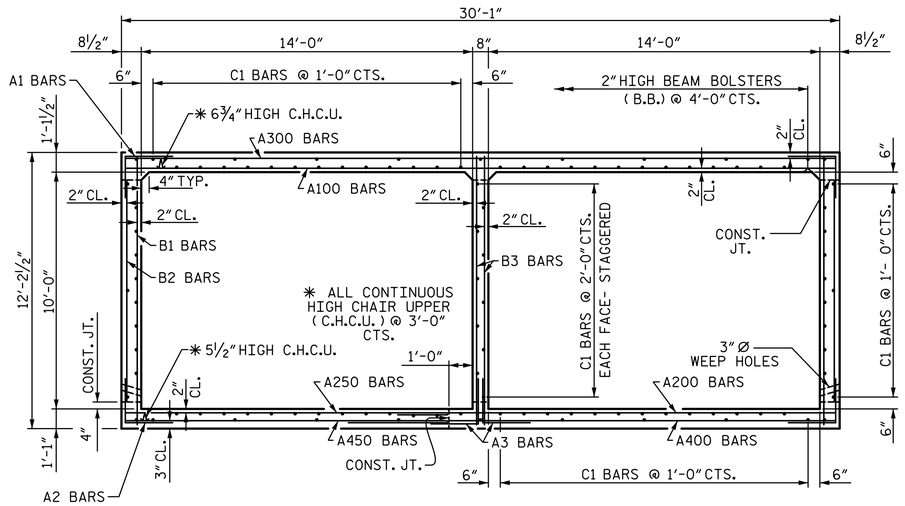
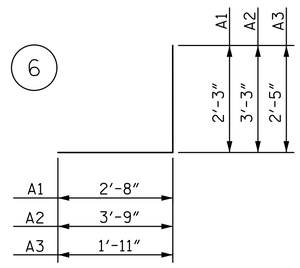


RIGHT ANGLE SECTION OF BARREL

THERE ARE 106 "C" BARS IN SECTION OF BARREL
(LOOKING DOWNSTREAM)

BAR TYPES



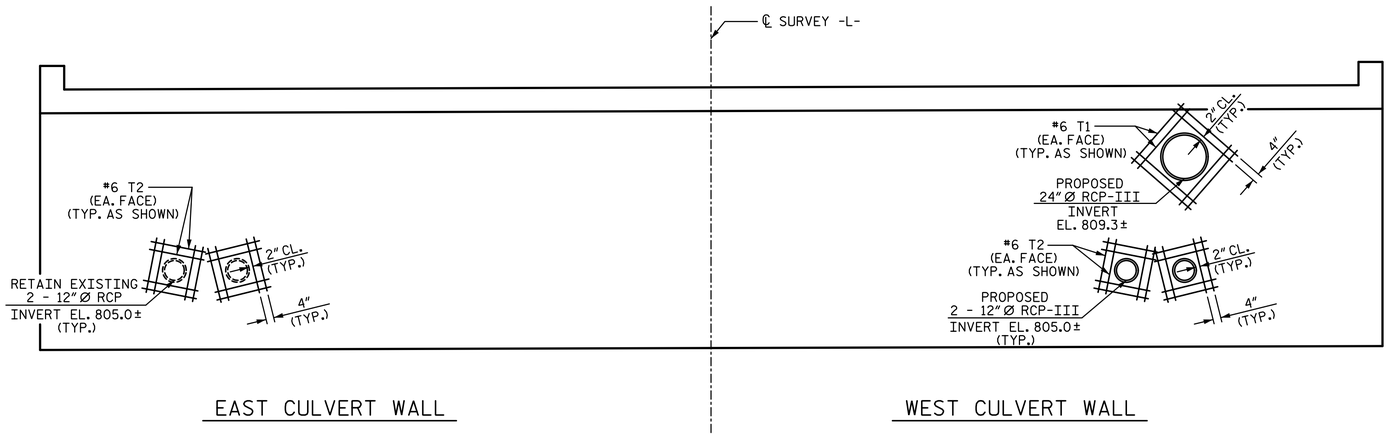
ALL BAR DIMENSIONS ARE OUT TO OUT

SPLICE LENGTH CHART

BAR	SPLICE LENGTH
B1	1'-9"
B3	1'-9"
C1	1'-11"
A200	2'-2"
A400	4'-3"

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A100	76	7	STR	29'-8"	4609	A400	97	8	STR	20'-7"	5331
A101	2	7	STR	26'-8"	109	A401	1	8	STR	19'-7"	52
A102	2	7	STR	24'-3"	99	A402	1	8	STR	17'-7"	47
A103	2	7	STR	21'-9"	89	A403	1	8	STR	15'-7"	42
A104	2	7	STR	19'-3"	79	A404	1	8	STR	13'-6"	36
A105	2	7	STR	16'-9"	68	A405	1	8	STR	11'-6"	31
A106	2	7	STR	14'-3"	58	A406	1	8	STR	9'-6"	25
A107	2	7	STR	11'-9"	48	A407	1	8	STR	7'-6"	20
A108	2	7	STR	9'-3"	38	A408	1	8	STR	5'-5"	14
A109	2	7	STR	6'-10"	28	A409	1	8	STR	3'-5"	9
A110	2	7	STR	4'-4"	18	A410	1	8	STR	18'-9"	50
						A411	1	8	STR	16'-9"	45
A200	107	5	STR	18'-6"	2065	A412	1	8	STR	14'-9"	39
A201	1	5	STR	16'-8"	17	A413	1	8	STR	12'-9"	34
A202	1	5	STR	14'-9"	15	A414	1	8	STR	10'-8"	28
A203	1	5	STR	12'-11"	13	A415	1	8	STR	8'-8"	23
A204	1	5	STR	11'-1"	12	A416	1	8	STR	6'-8"	18
A205	1	5	STR	9'-2"	10						
A206	1	5	STR	7'-4"	8	A450	102	8	STR	13'-4"	3631
A207	1	5	STR	5'-5"	6	A451	1	8	STR	11'-4"	30
A208	1	5	STR	3'-7"	4	A452	1	8	STR	9'-4"	25
A209	1	5	STR	18'-3"	19	A453	1	8	STR	7'-3"	19
A210	1	5	STR	16'-5"	17	A454	1	8	STR	5'-3"	14
A211	1	5	STR	14'-6"	15	A455	1	8	STR	11'-9"	31
A212	1	5	STR	12'-8"	13	A456	1	8	STR	9'-9"	26
A213	1	5	STR	10'-9"	11	A457	1	8	STR	7'-8"	20
A214	1	5	STR	8'-11"	9	A458	1	8	STR	5'-8"	15
A215	1	5	STR	7'-1"	7	A459	1	8	STR	3'-8"	10
A216	1	5	STR	5'-2"	5						
A217	1	5	STR	3'-4"	3	A1	218	5	6	4'-11"	1118
						A2	218	7	6	7'-0"	3119
A250	110	5	STR	13'-4"	1530	A3	142	5	6	4'-4"	642
A251	1	5	STR	11'-6"	12						
A252	1	5	STR	9'-7"	10	B1	142	4	STR	11'-7"	1099
A253	1	5	STR	7'-9"	8	B2	218	5	STR	9'-4"	2122
A254	1	5	STR	5'-10"	6	B3	142	5	STR	11'-7"	1716
A255	1	5	STR	4'-0"	4						
A256	1	5	STR	12'-8"	13	C1	318	4	STR	20'-11"	4443
A257	1	5	STR	10'-10"	11						
A258	1	5	STR	8'-11"	9	T1	16	6	STR	4'-0"	96
A259	1	5	STR	7'-1"	7	T2	64	6	STR	2'-10"	272
A260	1	5	STR	5'-2"	5						
A261	1	5	STR	3'-4"	3	G1	8	5	STR	30'-9"	257
A300	94	8	STR	29'-8"	7446	S2	6	8	STR	30'-9"	493
A301	4	8	STR	25'-2"	269	S3	6	8	STR	21'-5"	343
A302	4	8	STR	21'-1"	225	S4	6	8	STR	13'-10"	222
A303	4	8	STR	17'-1"	182						
A304	4	8	STR	13'-0"	139	REINFORCING STEEL			LBS		43127
A305	4	8	STR	9'-0"	96						
A306	4	8	STR	4'-11"	53	CLASS A CONCRETE BREAKDOWN					
						BARREL			CY		190.4
						HEADWALLS			CY		2.9



EAST CULVERT WALL

WEST CULVERT WALL

REINFORCING STEEL FOR PIPES IN CULVERT WALLS

NOTE: THE 24" Ø AND THE 12" Ø PIPES THROUGH THE WALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AND CUT AS NECESSARY TO CLEAR THE PIPES.

PROJECT NO. 17BP.7.R.22
GUILFORD COUNTY
STATION: 11+97.70 -L-

SHEET 4 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 14FT. X 10FT. CONCRETE BOX CULVERT 100° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-4
1			3			TOTAL SHEETS
2			4			7

DRAWN BY: D.G.VESTER DATE: 12/15
CHECKED BY: B.S. COX DATE: 12/15
DESIGN ENGINEER OF RECORD: C.O. CUEVAS DATE: 12/15

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PLANS PREPARED BY:
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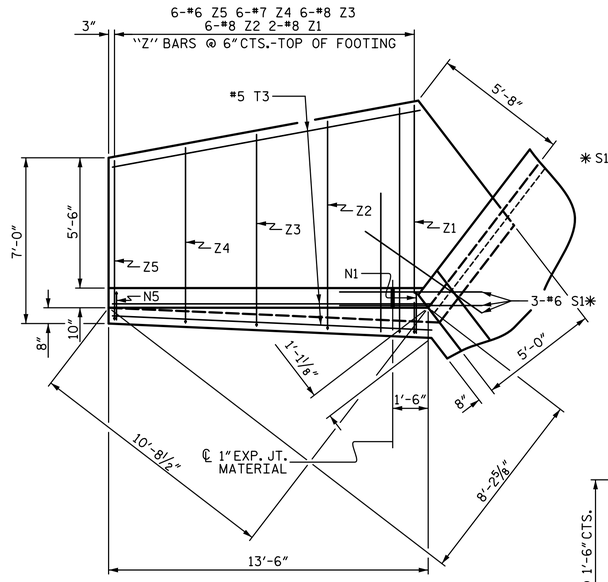
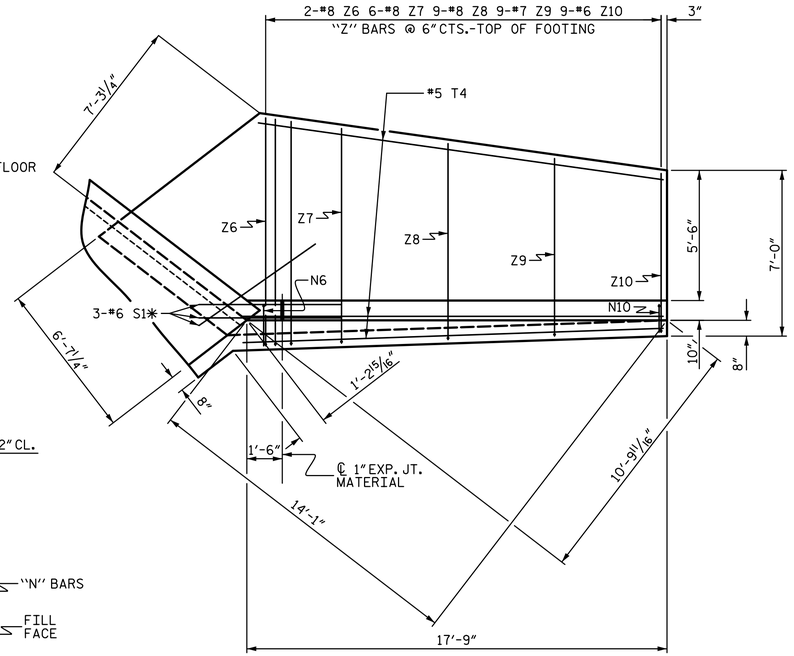
LICENSURE NO. C-2521

NORTH CAROLINA PROFESSIONAL SEAL 039857 ENGINEER CESAR O. CUEVAS
12/2/2015

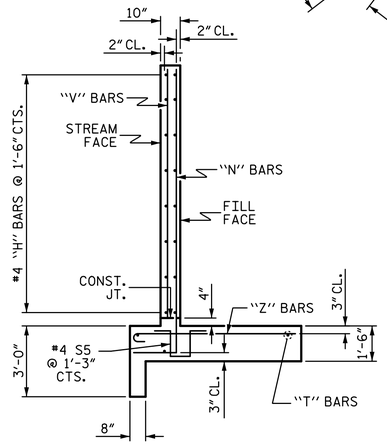
12/1/2015 9:51:39 AM G:\Projects\2012\17BP.7.R.22 (Guilford 895)\Structures\Drawings\Final\Guilford895_CU_04.dgn



PLAN W2

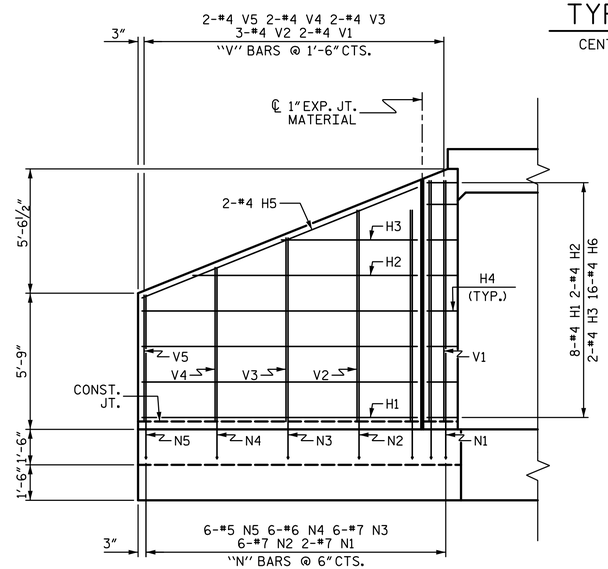


PLAN W1

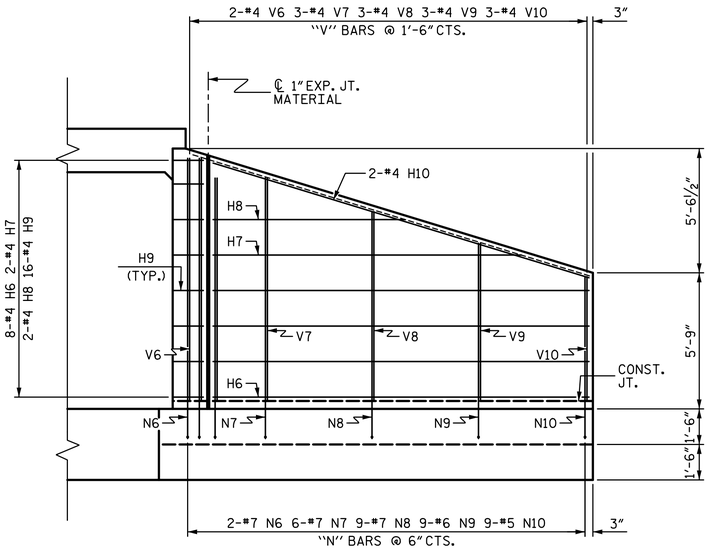


TYPICAL WING SECTION

CENTER #4 S5 AT FILL FACE OF WING WALL



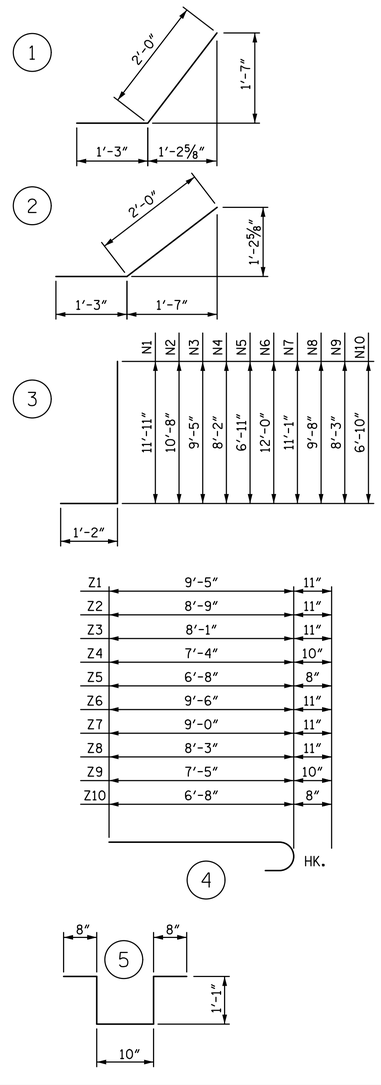
ELEVATION W2



ELEVATION W1

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	4	STR	11'-8"	125
H2	4	4	STR	9'-7"	26
H3	4	4	STR	6'-1"	16
H4	32	4	1	3'-3"	69
H5	4	4	STR	12'-7"	34
H6	16	4	STR	15'-11"	170
H7	4	4	STR	13'-2"	35
H8	4	4	STR	8'-5"	22
H9	32	4	2	3'-3"	69
H10	4	4	STR	16'-8"	45
N1	4	7	3	13'-1"	107
N2	12	7	3	11'-10"	290
N3	12	7	3	10'-7"	260
N4	12	6	3	9'-4"	168
N5	12	5	3	8'-1"	101
N6	4	7	3	13'-2"	108
N7	12	7	3	12'-3"	300
N8	18	7	3	10'-10"	399
N9	18	6	3	9'-5"	255
N10	18	5	3	8'-0"	150
S1	12	6	STR	6'-0"	108
S5	25	4	5	4'-4"	72
T3	6	5	STR	13'-6"	84
T4	6	5	STR	17'-9"	111
V1	4	4	STR	10'-4"	28
V2	6	4	STR	9'-1"	36
V3	4	4	STR	7'-10"	21
V4	4	4	STR	6'-7"	18
V5	4	4	STR	5'-4"	14
V6	4	4	STR	10'-5"	28
V7	6	4	STR	9'-6"	38
V8	6	4	STR	8'-1"	32
V9	6	4	STR	6'-8"	27
V10	6	4	STR	5'-3"	21
Z1	4	8	4	10'-4"	110
Z2	12	8	4	9'-8"	310
Z3	12	8	4	9'-0"	288
Z4	12	7	4	8'-2"	200
Z5	12	6	4	7'-4"	132
Z6	4	8	4	10'-5"	111
Z7	12	8	4	9'-11"	318
Z8	18	8	4	9'-2"	441
Z9	18	7	4	8'-3"	304
Z10	18	6	4	7'-4"	198

REINFORCING STEEL	5799 LBS
FOR 4 WINGS	
CLASS A CONCRETE	
4 WINGS	51.2 CY
2 CURTAIN WALLS	2.0 CY
TOTAL	53.2 CY

PROJECT NO. 17BP.7.R.22

GUILFORD COUNTY

STATION: 11+97.70 -L-

SHEET 5 OF 7

DRAWN BY: D.G.VESTER DATE: 12/15

CHECKED BY: B.S. COX DATE: 12/15

DESIGN ENGINEER OF RECORD: C.O. CUEVAS DATE: 12/15

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PLANS PREPARED BY:

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037857 CESAR O. CUEVAS

12/2/2015

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR CONCRETE BOX CULVERT

H = 10'-0" SLOPE = 2:1

105° SKEW

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1			3			TOTAL SHEETS
2			4			7

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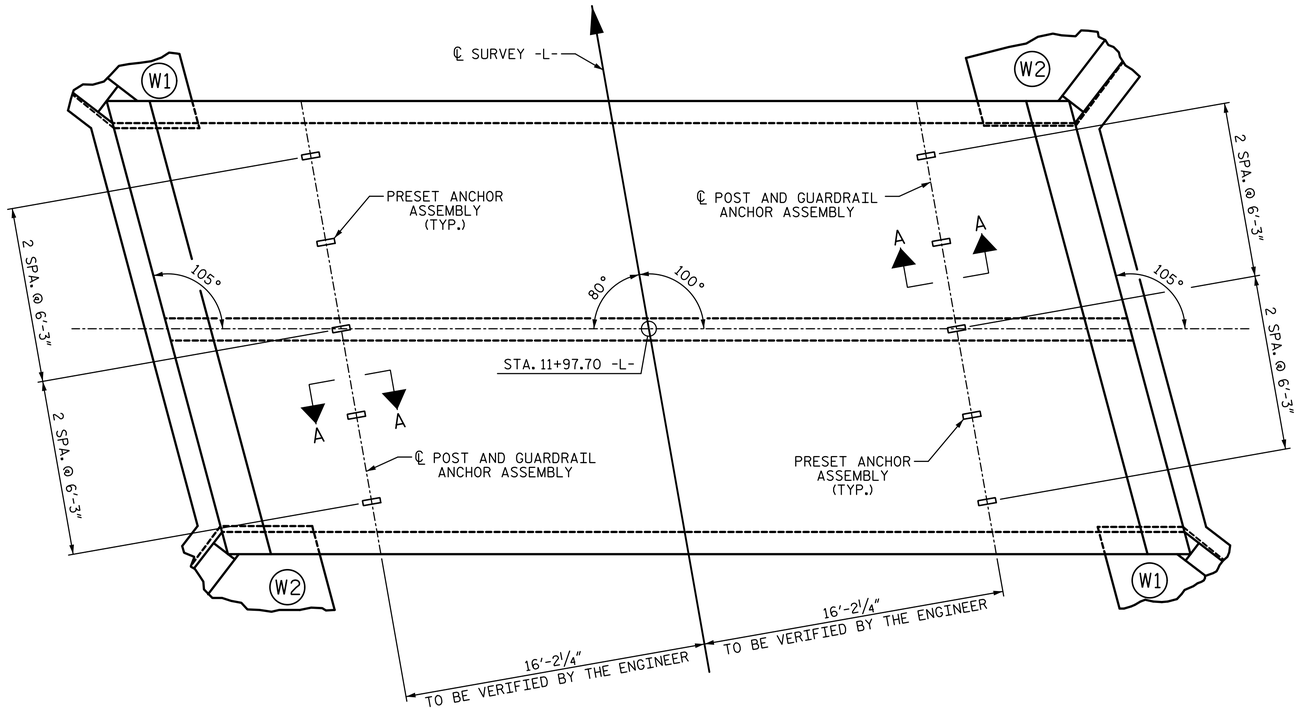
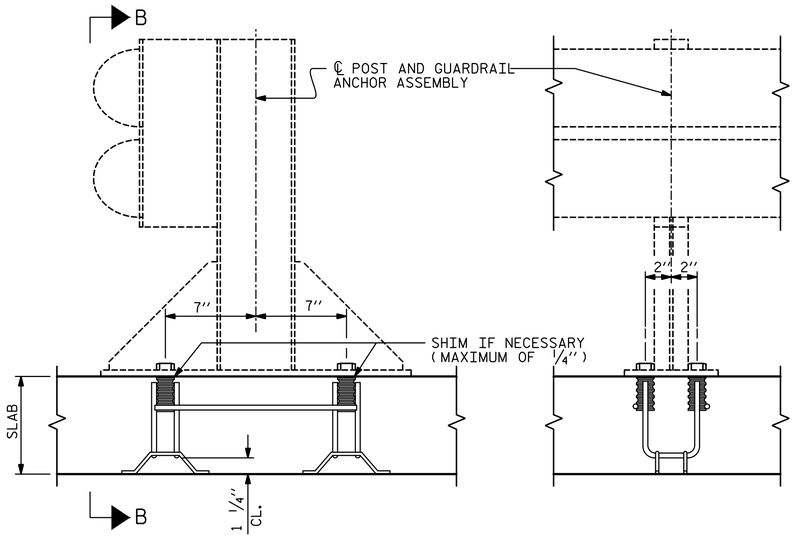


PLAN

(SHOWING GUARDRAIL ANCHOR ASSEMBLY SPACING)



SECTION A-A

SECTION B-B

NOTES:

THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. ERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2½".

B. 4 - 1"Ø X 2¼" BOLTS WITH WASHERS, BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1"Ø X 2¼" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 P.S.I. AS AN OPTION, A 7/16"Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO INSURE FIT.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CLASS "A" CONCRETE.

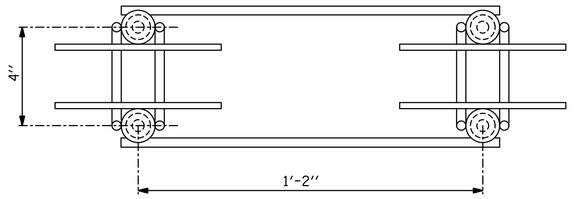
FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

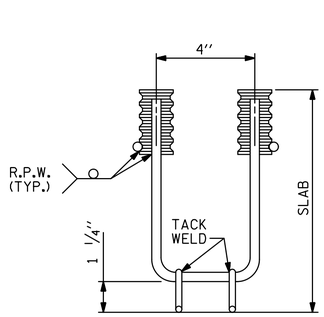
PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.

SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

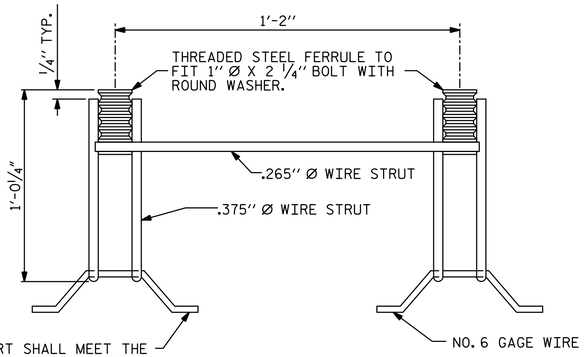
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 1"Ø BOLT IS 21.8 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.



PLAN



ELEVATION



SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

DRAWN BY: D.G.VESTER DATE: 12/15
CHECKED BY: B.S. COX DATE: 12/15
DESIGN ENGINEER OF RECORD: C.O. CUEVAS DATE: 12/15

PLANS PREPARED BY:
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12/2/2015

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PROJECT NO. 17BP.7.R.22
GUILFORD COUNTY
STATION: 11+97.70 -L-

SHEET 6 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ANCHORAGE DETAILS FOR GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			7

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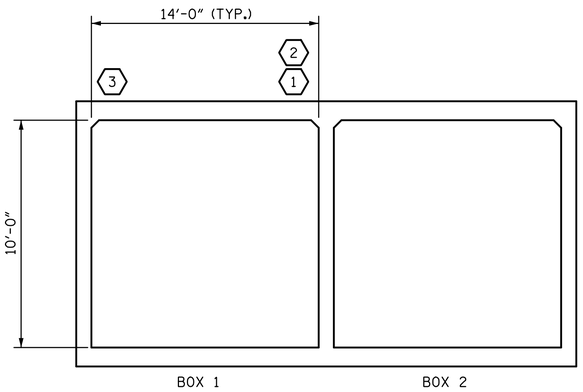
LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT				SHEAR				
								RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	⟨1⟩	1.53	--	1.75	1.62	1	EXT WALL - TOP	10	1.53	1	TOP SLAB - RT END	14	
		HL-93 (OPERATING)	N/A		1.98	--	1.35	2.10	1	EXT WALL - TOP	10	1.98	1	TOP SLAB - RT END	14	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.53	55.1	1.75	1.62	1	EXT WALL - TOP	10	1.53	1	TOP SLAB - RT END	14	
		HS-20 (OPERATING)	36.000		1.98	71.4	1.35	2.10	1	EXT WALL - TOP	10	1.98	1	TOP SLAB - RT END	14	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.71	36.6	1.40	2.71	1	EXT WALL - TOP	10	3.04	1	TOP SLAB - RT END	14	
		SNGARBS2	20.000		2.58	51.6	1.40	2.58	1	EXT WALL - TOP	10	2.70	1	TOP SLAB - RT END	14	
		SNAGRIS2	22.000		2.71	59.6	1.40	2.71	1	EXT WALL - TOP	10	2.81	1	TOP SLAB - RT END	14	
		SNCOTTS3	27.250	⟨3⟩	1.54	42.0	1.40	1.54	1	EXT WALL - TOP	10	1.57	1	TOP SLAB - RT END	14	
		SNAGGRS4	34.925		1.70	59.4	1.40	1.70	1	EXT WALL - TOP	10	1.75	1	TOP SLAB - RT END	14	
		SNS5A	35.550		1.67	59.4	1.40	1.67	1	EXT WALL - TOP	10	1.69	1	TOP SLAB - RT END	14	
		SNS6A	39.950		1.67	66.7	1.40	1.67	1	EXT WALL - TOP	10	1.67	1	TOP SLAB - RT END	14	
		SNS7B	42.000		1.65	69.3	1.40	1.67	1	EXT WALL - TOP	10	1.65	1	TOP SLAB - RT END	14	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.24	73.9	1.40	2.62	1	EXT WALL - TOP	10	2.24	1	TOP SLAB - RT END	14	
		TNT4A	33.075		1.79	59.2	1.40	1.79	1	EXT WALL - TOP	10	1.79	1	TOP SLAB - RT END	14	
		TNT6A	41.600		1.65	68.6	1.40	1.69	1	EXT WALL - TOP	10	1.65	1	TOP SLAB - RT END	14	
		TNT7A	42.000		1.68	70.6	1.40	1.74	1	EXT WALL - TOP	10	1.68	1	TOP SLAB - RT END	14	
		TNT7B	42.000		1.68	70.6	1.40	1.68	1	EXT WALL - TOP	10	1.72	1	TOP SLAB - RT END	14	
		TNAGRIT4	43.000		1.71	73.5	1.40	1.79	1	EXT WALL - TOP	10	1.71	1	TOP SLAB - RT END	14	
		TNAGT5A	45.000		1.72	77.4	1.40	1.79	1	EXT WALL - TOP	10	1.72	1	BOT SLAB - RT END	14	
		TNAGT5B	45.000		1.62	72.9	1.40	1.79	1	EXT WALL - TOP	10	1.62	1	TOP SLAB - RT END	14	



LRFR SUMMARY

(LOOKING DOWNSTREAM)

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

PROJECT NO. 17BP.7.R.22

GUILFORD COUNTY

STATION: 11+97.70 -L-

SHEET 7 OF 7

DRAWN BY: D.G.VESTER DATE: 12/15

CHECKED BY: B.S. COX DATE: 12/15

DESIGN ENGINEER OF RECORD: C.O. CUEVAS DATE: 12/15

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12/2/2015

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-7
1			3			TOTAL SHEETS
2			4			7

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF	
STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION	
GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR	
UNTREATED - EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT: ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

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